

from the California Academy of Sciences

# LIVE



Welcome  
to your new  
Academy.  
It's eye-opening!

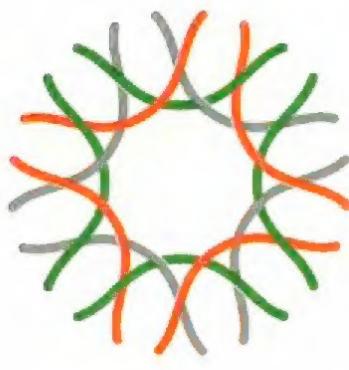
## Look Inside:

Opening weekend

Fall calendar of events

An architect's vision

Exhibit previews



## CALIFORNIA ACADEMY OF SCIENCES

**California Academy of Sciences**

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The penguins are preening, the lizards are leaping, and the frogs are rehearsing their best chorus numbers. After nearly a decade of dreaming, planning, and construction, the new California

Academy of Sciences is about to open its doors. Inside, you'll find some familiar friends—long-time favorites like the dioramas of African Hall, the swinging pendulum, and the alligator-filled Swamp. And you'll also encounter a world of new adventures, including a winding journey through a four-story rainforest, a trip to the international space station, and a shark's-eye view into the depths of a living coral reef. Thirty-eight thousand aquarium animals—far more than ever before—will bring new life to topics like evolution and climate change, and state-of-the-art new technologies will power immersive, interactive displays.

As Academy members, you have helped to create this bold new museum, and you'll be among the first to explore it in just a few days. On behalf of the penguins, the lizards, the Academy's staff and volunteers, and the millions of visitors who will soon see science in a whole new light, thank you for your support. We hope to see you here soon.

**Greg Farrington**  
Executive Director

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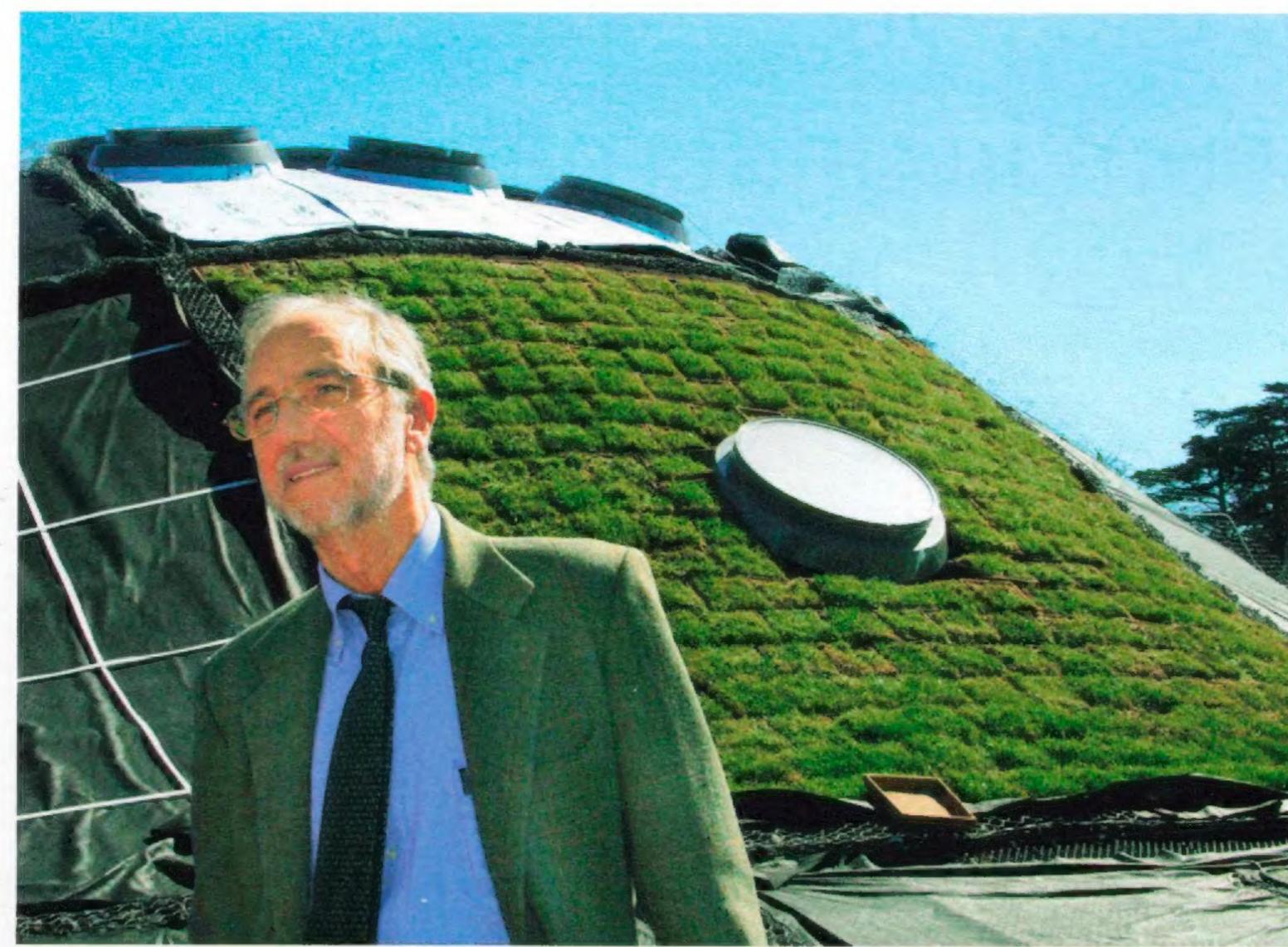
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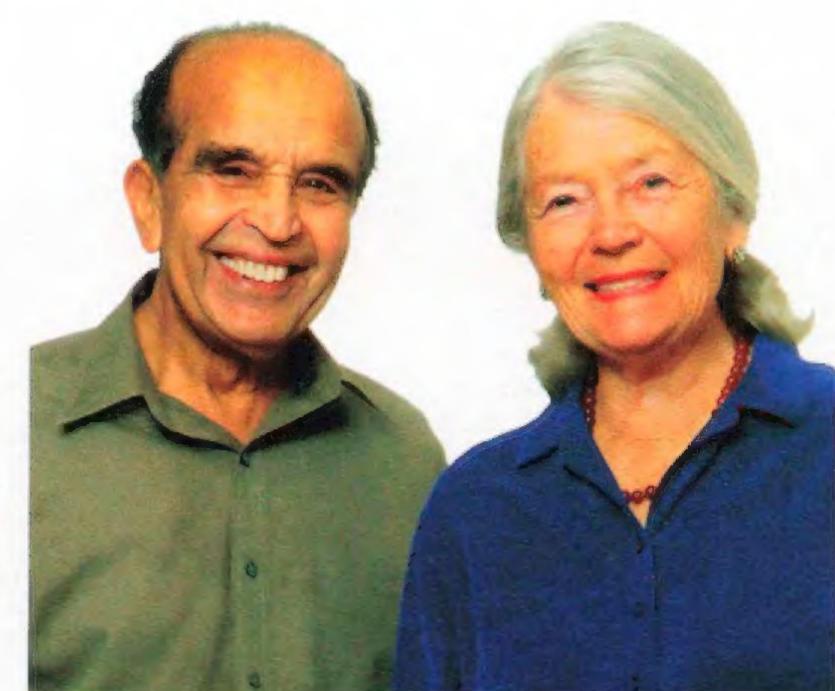
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Red eyed tree frogs are among the hundreds of live animals in the new Academy's Rainforests of the World exhibit.

Although they lack sharp teeth and claws, these brightly hued amphibians can scare potential predators with a secret weapon—a startling flash of color. Learn more in the Creature Closeup feature on page 10.

Photo: Tim Flach

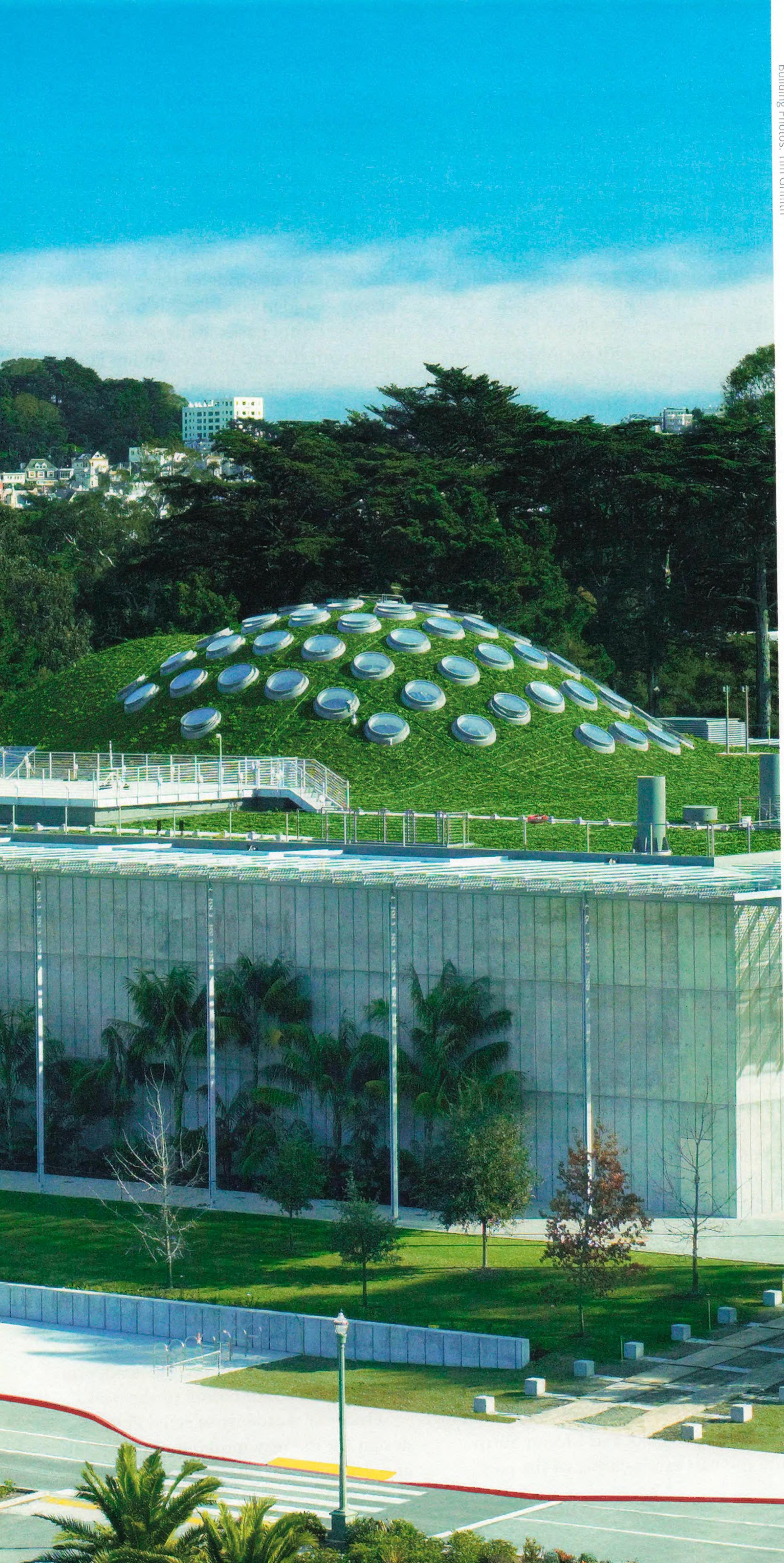
## On the Back

Academy scientist Charles Griswold explores one of the last frontiers of entomology—the rainforest canopy.

"... I decided that the roof should be like a piece of the park flying—as if you cut out a piece of the park, lifted it up, and slid the museum in underneath."

RENZO PIANO





# The Living Museum

With his new home for the California Academy of Sciences, award-winning architect **Renzo Piano** creates the greenest museum on Earth—an organic building that literally lives and breathes.

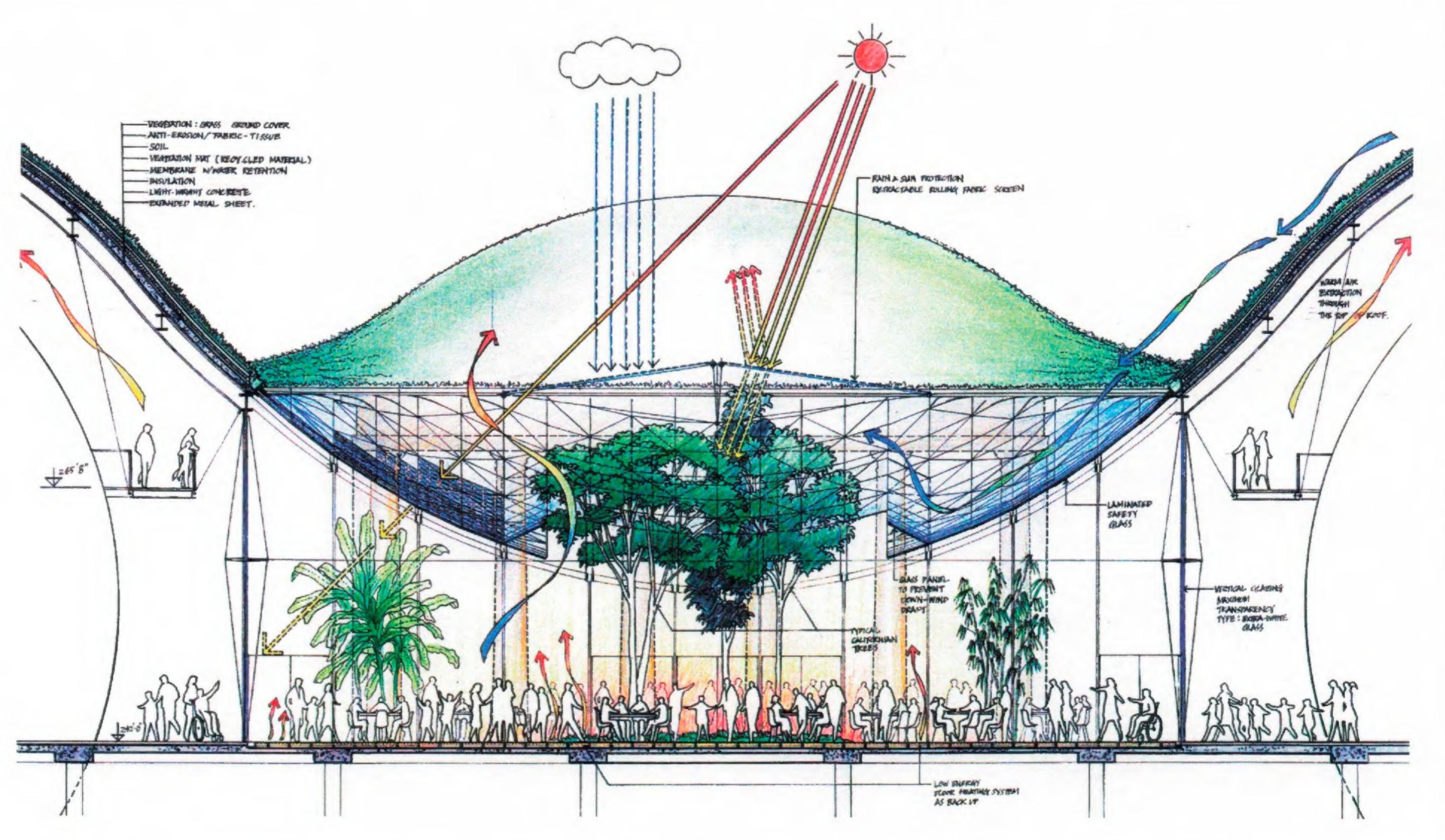
**N**early 10 years ago, the California Academy of Sciences embarked on a remarkable journey, launching the largest museum rebuilding project in more than a century and reinventing the traditional natural science museum along the way. Today, the new Academy building stands as an example of the power and potential of sustainable architecture. Expected to receive the highest possible rating from the U.S. Green Building Council, it employs a wide range of energy-saving technologies, makes creative use of recycled

came to the Academy with fully developed models and polished presentations. They unveiled their visions for the new Academy building with flair and aplomb. Then, the last candidate on the list arrived, an Italian architect named Renzo Piano. Piano showed up without attitude or entourage, carrying nothing but a sketchpad and a green pen. “Unlike his predecessors, Renzo wanted to start a dialogue with the Academy—to understand the soul of the institution,” says former Executive Director Patrick Kocolek. “From the very beginning, it

After about an hour, Piano came back downstairs with a simple sketch—an undulating line that would become the iconic living roof of the new California Academy of Sciences.

“I immediately understood that the big challenge was to make a new building that would belong to the park,” says Piano. “Golden Gate Park is one of the most beautiful parks in the world—it’s filled with life and nature. And of course the Academy is a natural science museum that is all about nature. These are two things that should belong to

The hills of the living roof are an integral part of the museum’s natural ventilation scheme. Cool air drains down the slopes of the hills into the open piazza at the center of the building. As hot air rises, it escapes through skylights at the top of the domes.



materials, and blends seamlessly into the surrounding parkland. This innovative building—a perfect expression of the Academy’s mission to explore, explain, and protect the natural world—is a feat of complex engineering and sophisticated site planning. It started, however, as a simple line drawing.

In 1999, the Academy invited about 40 architects to apply for the job of designing its new home. Six of these candidates—all well-known architects with impressive résumés—were selected to come out to San Francisco and present their ideas to the Academy’s Board of Trustees. The first five candidates

was clear that he valued collaboration.”

Piano spent several days talking to Academy scientists and educators about what they did and what they needed their building to do. He also spent time walking around Golden Gate Park, getting a feel for the site that would house the new museum. Finally, he went up to the roof of the Academy’s original building in the park and looked out at the surrounding topography of San Francisco. From that vantage point, sitting amidst the highest branches of the park’s cypress trees, he saw the dramatic hills of Twin Peaks and Mount Sutro and the vast green carpet of the park.

each other. And so I decided that the roof should be like a piece of the park flying—as if you cut out a piece of the park, lifted it up, and slid the museum in underneath.” This visual connection between the Academy and park was strengthened in Piano’s design by an emphasis on transparency. From almost any point in the building, visitors can see out to the surrounding parkland. “This way, you don’t feel the building as an aggressive presence,” says Piano. “Instead, you feel like it’s a continuation of the park.”

Once the Academy selected Piano’s design for the new museum, the research and development phase of the project be-

## Q&A with Renzo Piano



### Q: What was your inspiration for the new Academy design?

A: The first idea, from the first sketch, was really the roof. The idea was to make the roof of the new museum like a piece of the park flying. I also wanted to play with natural light, and with transparency, so that from the inside of the museum you can see where you are. The chance to be in the center of Golden Gate Park is immense, so you have to take advantage of that.

### Q: You've designed a number of art museums, but this was your first science museum. Did you approach this museum project differently?

A: Architecture is about building emotion and telling stories. A natural science museum should tell a story about energy, about life, about exploration, about wonder. I love curiosity. I love to put my nose into everything. And the idea that a group of scientists here spend their life searching for new species around the world—it touched my imagination. What a fantastic role—to design a natural science museum for this Academy.

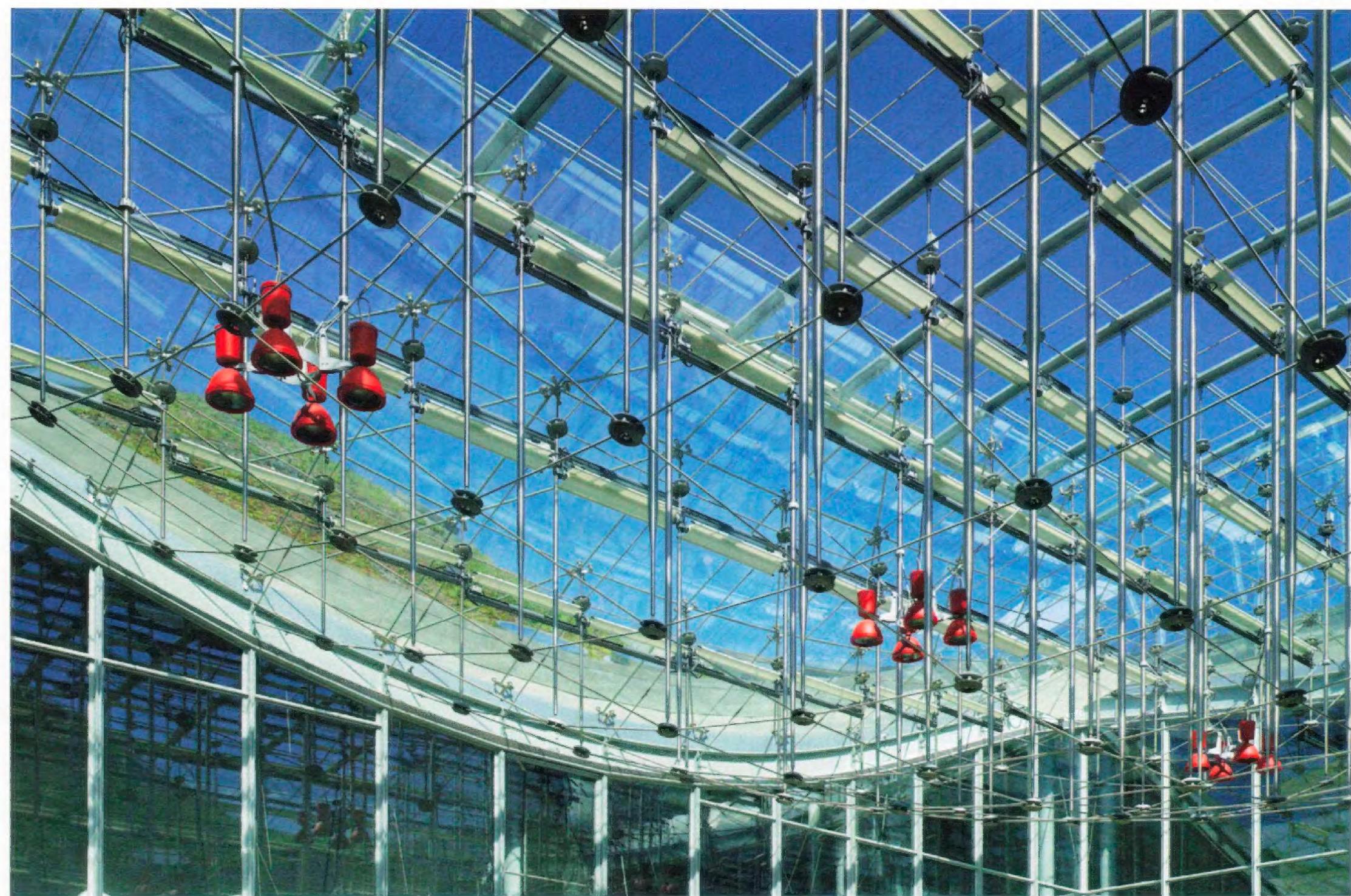
### Q: Why did you feel it was important to build sustainably?

A: The building is all about nature, so it has to be sustainable. Saving energy is part of the story. Today, we have all become aware that the Earth is fragile. I think in this century, the most inspiring element for architecture will be the fragility of Earth. It's not about morality—it's about necessity. Buildings have to become increasingly clever in the way they use energy, and I hope this will be visible when you walk into the new Academy.

gan. With the help of a team of engineers from Arup, local partner architects from Stantec, and contractors from Webcor, Piano's office began to build models and mock-ups of some of the building's unprecedented features. All told, they assembled 40 full-scale mock-ups and a number of smaller models to determine the best—and most sustainable—way to bring the building to life.

To test the design of the dramatically sloped living roof, they created a full-scale section of one of the largest hills. Steel beams were bent into precise curves

cies for the roof. They created a sloped planter box, installed it on the roof of the Academy's original building in Golden Gate Park, and planted it with over 30 different species of native California plants. For two years, they watched the progress of the plants, taking photographs once a month to see which species flourished at different times of the year. Based on the results of their two-year experiment, they chose nine species of native California plants—including the iconic California poppy—for the new Academy's 2.5-acre living roof.



In the event of rain, weather stations on the roof trigger a Mylar rain screen to slide across and cover the open piazza.

with the help of a 3D computer model, and several different soil retention methods were tested. During this trial, the team developed an innovative new installation system to help keep the soil and plants in place on the steep slopes of the roof. Using coconut husk and tree sap, they fabricated biodegradable trays that could be filled with plants and then installed like tiles on the roof. The roots of the plants could quickly grow through the side of one tray and into the next, locking the tiles together in a strong mat.

Academy botanist Frank Almeda also worked with a team of living roof experts from Rana Creek to select the plant spe-

Like all living roofs, the Academy's planted rooftop provides superior insulation for the building below, substantially reducing energy needs for heating and cooling. It also absorbs 98% of the rainwater that hits it, preventing about 3.6 million gallons of storm water from carrying pollutants into the ecosystem each year. And, because it is planted exclusively with native species, it is an important resource for local wildlife. In fact, the Academy's roof is now home to the largest concentration of native California plants in all of San Francisco County. "We have already started to see butterflies, hummingbirds, beetles, and



other native species frequenting the roof,” says Almeda. “A new research project is underway to monitor these visitors.”

An allusion to the seven hills of San Francisco, the hills on the Academy’s roof not only echo the surrounding topography—they are also part of the natural ventilation scheme for the building. As cool air drains down the sides of the hills, it gets sucked into the open piazza at the center of the building. This fresh air is then funneled into the exhibits through louvered windows along the sides of the piazza. Meanwhile, as hot



The planetarium dome, which is tilted at a 30-degree angle, is cantilevered out over the Philippine Coral Reef exhibit.

air rises from the exhibit floor, skylights embedded in the domes automatically open, functioning as vents. Motorized façade windows also open and close to bring cool air into the building. Airflow patterns inside the new Academy were first predicted using computer models, then confirmed by putting a scale model of the building through wind tunnel tests. “After 18 weeks of testing, we were able to optimize the natural ventilation strategy,” says Karl Lyndon, a mechanical engineer at Arup. “Today, ventilation in the 1.8-million cubic feet of exhibit space is better than in an air conditioned building.”

In addition to natural ventilation, Piano turned to natural light as a primary energy-saving technique. The skylights that vent the building also funnel sunlight down to the living rainforest and coral reef below. Before construction began, Arup conducted a year-long daylighting study to determine the optimal positions for the two exhibits and their corresponding skylights. Today, 80 skylights deliver vital light to the trees and plants of the living rainforest, and an additional 18 skylights support the coral in the Academy’s Philippine Coral Reef.

Natural light also streams into the building through large walls of windows on all four sides of the building, as well as through the piazza—a central courtyard that is partially covered by a perimeter of glass panels. In order to support this glass canopy, Piano designed a cable-net structure that uses tension to keep the glass panels in place. “The architecture of the piazza was inspired by a spider web,” says Piano. “It’s built the same way a spider would build its web, by pulling cables. The language of this architecture is very close to nature. It doesn’t copy nature, of course. That’s impossible—nature is too clever! But nature has in some way inspired it.”

In fact, Piano drew inspiration from nature for a number of features in the building. He compares the acoustical tiles in the ceiling, which follow the contours of the curved roof beams, to the scales of a fish. He draws parallels between the “vibrating” light that filters through the photovoltaic cells in the solar canopy and the dappled light that falls through leaves in a forest. He points to the miles of aquarium pipes that run through the building and compares them to the veins of a living organism. “This building is very organic,” says Piano. “It’s the opposite of monumentality. Big monumental buildings are intimidating. They are about stone, marble, massiveness, and power. This building is telling a completely different story. It’s about lightness, it’s about life, it’s about transparency, and it’s about enjoyment.”

“The idea came to me to make a flat roof, like a flying carpet, and in the places where you need to put the planetarium and the rainforest, it could curve up and curve down. It makes it more organic, a bit like it’s growing.”

RENZO PIANO



#### Where in the World

These colorful frogs inhabit tropical rainforests throughout most of Central America. They are commonly found in lowland rainforests and surrounding hills, particularly in areas close to rivers and ponds. As adults, they are almost exclusively arboreal—their species name, *callidryas*, derives from two Greek words: *kallos*, or beautiful, and *dryas*, or tree nymph.



#### Where in the Academy

This red eyed tree frog has just taken up residence inside the Academy's *Rainforests of the World* exhibit—a four-story glass dome that houses hundreds of live animals. A poster species for rainforest conservation, it can be found in the Costa Rica gallery at the top of the dome, along with dart frogs, snakes, and free-flying birds and butterflies.

#### Diet

Active at night, this ambush predator will eat anything that fits into its mouth—sometimes even smaller frogs. However, its usual diet is composed of crickets, moths, flies, and grasshoppers.

#### A Sign of Maturity

When they first emerge from the water, young froglets have yellow eyes. The characteristic red eye coloration does not develop until about two weeks after metamorphosis, when it appears first around the periphery of the eye. Over a period of several days, it spreads inward to make the iris wholly red.

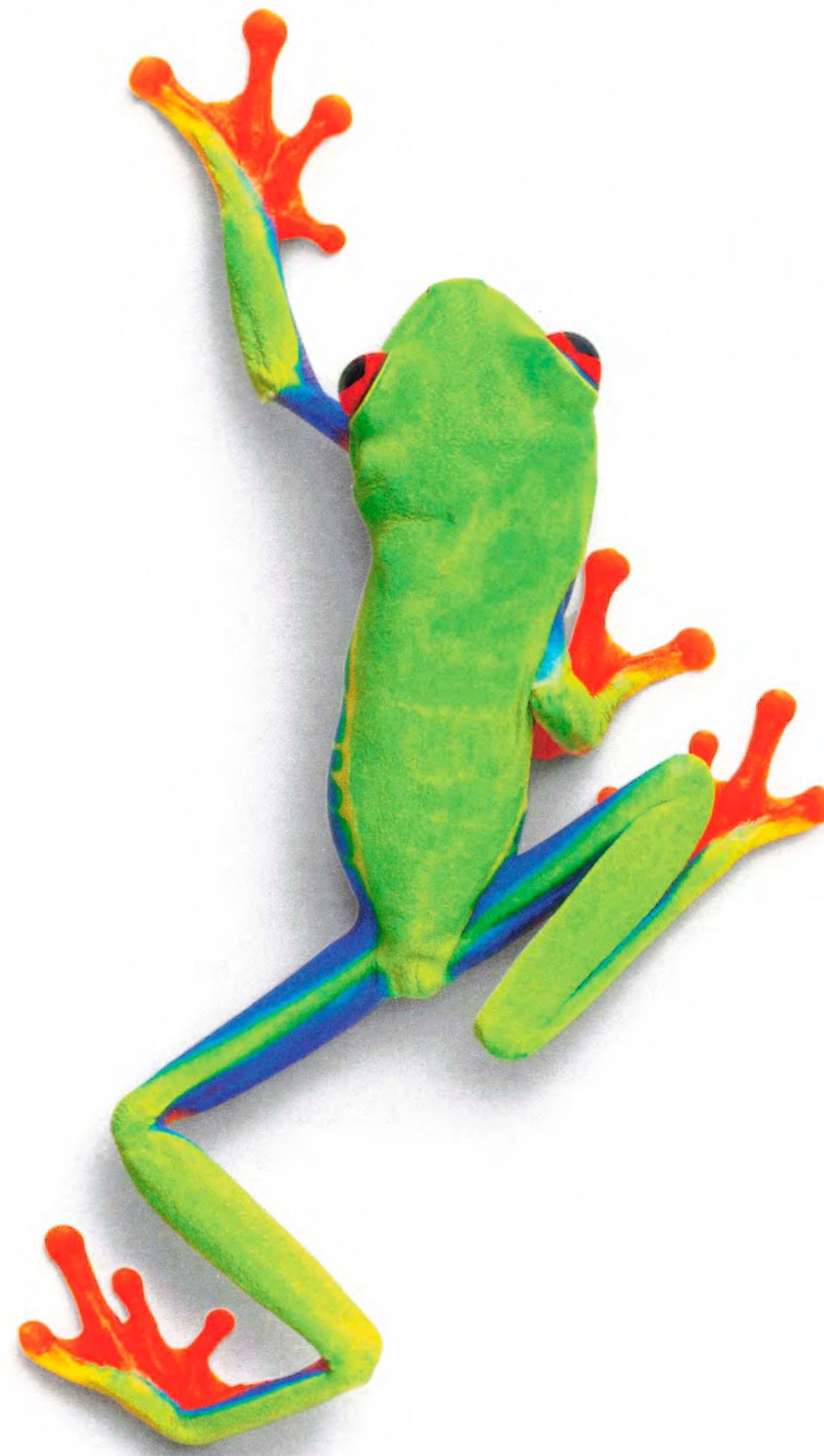
# Red Eyed Tree Frog

Despite its bright hues and flashy stripes, the red eyed tree frog (*Agalychnis callidryas*), is actually quite skilled at blending in—most of the time. During the day, this tree-dwelling amphibian attaches itself to the underside of a leaf, using its toe pads for suction. With its eyes closed and its feet and legs carefully tucked under its body, the resulting green lump normally escapes detection. However, if the frog senses danger, its vivid scarlet peepers pop open and its rainbow-striped legs unfurl, startling any potential predators into at least briefly reconsidering their meal choice. This scare tactic, called “startle coloration,” gives the frog the split second it needs to hop away to safety.

While most frogs lay their eggs directly into the water, red eyed tree frogs deposit theirs on leaves that hang

over ponds or rivers. When the clutches of eggs have developed into tadpoles, normally within about seven to nine days, the tadpoles swim around vigorously inside their eggs until the membrane ruptures. The fluid released from the ruptured eggs helps to wash all the tadpoles down the leaf and into the waiting water below.

New research suggests that embryos can hatch up to two or three days early if they sense danger. For instance, the vibrations caused by the approach of a snake can prompt an entire clutch of embryos to hatch within seconds, even if they are only five days old. Embryos are able to distinguish between a potentially lethal snake attack and a relatively non-dangerous rainstorm by the duration and timing of the resulting vibrations.





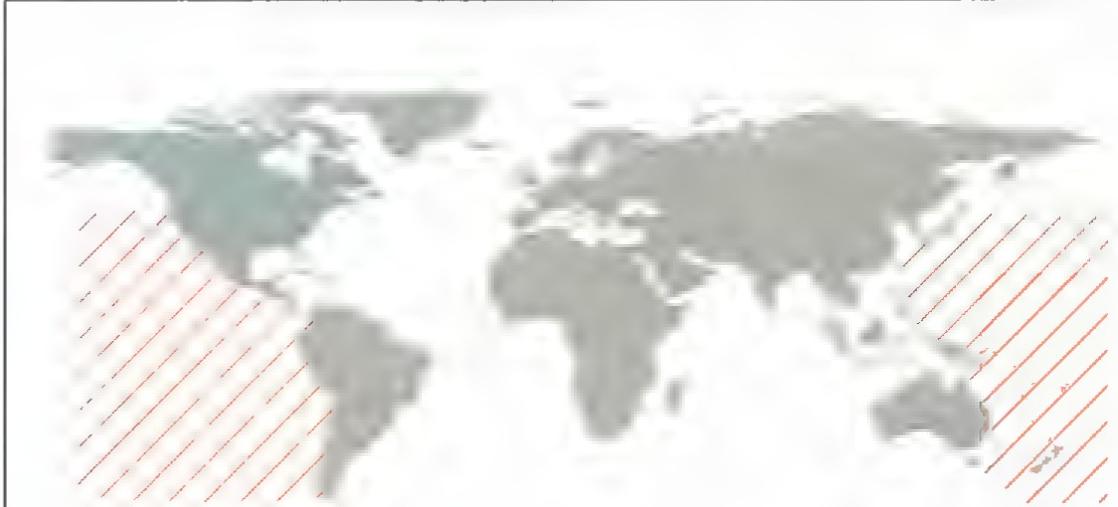
# Pacific Footballfish

In 1985, when deep-sea fishermen in Monterey Bay, California, hauled up their nets and found this specimen inside, the first words out of their mouths were most likely, “What in the world is this little beast?” This six-inch-long fish, with its globular body, prickly skin, needle-sharp teeth, minuscule eyes, and a strange stalk on its head, embodied all that was mysterious about the deep sea. The fishermen gave their catch to the California Department of Fish & Game, who in turn gave it to the Academy’s Ichthyology Department.

The specimen was later identified as a Pacific footballfish, or *Himantolophus sagamius*. It is one of over 300 living species of anglerfishes, which are named after their method of catching prey. In these fish, the first spine of the dorsal fin has been modified into a stalk with a fleshy bulb at the end. Using this as a

lure, an anglerfish will remain motionless until a curious fish or other prey approaches to within striking distance. Then, in a lightning-fast motion, it will suck the prey into its massive mouth. Its teeth, which can pivot inward, ensure that whatever goes in will never come out.

Male and female anglerfish differ dramatically in size—in some cases, the males are up to 10 times smaller. Furthermore, the males of some species (although not the Pacific footballfish) have evolved to be “sexual parasites.” These males have no lures, but they have well-developed olfactory organs to locate females, and sharp teeth to grab onto them. Once attached to the female, the male loses its eyes and all internal organs except for the testes. It becomes a permanent appendage, drawing nutrition from the female host and serving only as a source of sperm.



## Where in the World

*Himantolophus sagamius* lives in the Pacific Ocean at depths of 2,000 – 3,300 feet. Sunlight does not penetrate this far down, so animals there live in eternal darkness. The water pressure ranges from 900 – 1,500 pounds per square inch, and the temperature hovers a few degrees above freezing.

## Academy Collection

The Academy has approximately 900 anglerfish specimens in its ichthyology collection. Of these, 20 are footballfishes—the family to which *Himantolophus sagamius* belongs. The oldest footballfish in the collection was captured in 1925 off the coast of New Jersey.

## Diet

Food is scarce in the deep, and chance encounters in total darkness are rare. Therefore, a footballfish will feed on whatever can fit in its mouth—which is quite a lot, considering the mouth’s excessive size. The hapless victims are usually other fish, squid, and crustaceans.



*Himantolophus* sp.

## Glow in the Dark

Deep-sea anglerfish, like the Pacific footballfish, live in complete darkness—so how do they use their lures to attract prey? The answer is bioluminescent (or light-producing) bacteria. These bacteria live in the bulb at the end of the lure, and they glow brightly enough to attract curious prey.



## Food for Thought:

Chefs Loretta Keller and Charles Phan redefine museum food with a pair of innovative dining destinations.

**J**ust as the Academy's new building is uniquely integrated into its park setting, its two restaurants are a seamless extension of the museum experience. The casual Academy Café and the full service Moss Room will be treated like exhibits, encouraging visitors to ponder the vital relationship between food and culture and to consider the benefits of eating sustainably.

San Francisco-based chefs Loretta Keller (COCO5OO) and Charles Phan (Slanted Door) are collaborating to open and run the café and restaurant. As Keller notes, the two chefs share "the same approach to food—it's all about soul and story." Both menus will highlight local, seasonal, organic produce; sustainable seafood that adheres to the Academy's Sea-

food Watch standards; and locally-sourced, hormone-free meats. Not only is sustainable food a must today, Phan says, "but in these restaurants, we also want to preserve culture. We want to create an educational experience in which the food has a story."

In the Academy Café, healthy, kid-friendly choices on the menu will reflect many of the cultural influences in the Bay Area. From steamed buns and spring rolls, to chicken noodle soup and spaghetti and meatballs, the menu will incorporate many items with widespread appeal.

The Moss Room will serve dishes inspired by the bounty of the Bay Area in an elegant setting. The room takes its name from a large wall of living moss that will rise from an aquarium tank filled with Southeast Asian river fishes.

The menu will change weekly and will feature house-made pastas, earthenware-baked dishes, and other house specialties. In keeping with the kitchen offerings, small-production, organic, bio-dynamic wines and spirits will be offered.

The café and restaurant will not only operate with environmentally responsible practices, they will also highlight those measures. The menus will contain information about the benefits of supporting local, organic farms. Café patrons will be encouraged to compost any leftover food, and educational signage will be posted about the benefits of composting.

Behind the scenes, water- and energy-efficient foodservice appliances will be installed, non-toxic cleaning products will be used, and all

café and restaurant employees will receive training about waste reduction and sustainability practices. By avoiding unnecessary packaging and materials, using compostable take-out containers, and providing washable dishware and utensils, both establishments will reduce the amount of waste produced.

Perhaps Keller's popular beef cheek mole tacos will be your favorite dish, or maybe it will be Phan's beloved grapefruit and jicama salad. The chefs' goal is to leave a lasting impression in your mind, not only with incredible food, but by integrating the compelling stories behind the restaurants' practices into the dining experience. The "food for thought" will get you thinking, and the food you taste will keep you coming back for more.

# Mush! Explore Nature and Culture at Alaska's Iditarod

**F**rigid climates don't faze Dave Kavanaugh, an entomologist at the Academy. In 1973, Kavanaugh made his first trip to Alaska looking for beetles that live in cold places, his scientific specialty. Since then, he's been back countless times—few more memorable than the trips he's made with Academy travelers.

Kavanaugh loves Alaska for the raw nature, the real wildness. "It's a primitive place where life hangs in the balance," he says. "I often feel like I was born a couple hundred years too late, and visiting Alaska, I can experience a little of what I missed."

In March of 2009, Kavanaugh and his wife Bev, who shares his fascination with Alaska, will lead an Academy group on one of their favorite northerly excursions. During the adventure, Academy travelers will experience two great events of Alaskan nature and culture: the aurora borealis, the mesmerizing light show caused when material thrown off the Sun's surface collides with Earth's atmosphere; and the Iditarod, the historic dogsled race that tests the endurance of humans and canines alike.

Called the "Last Great Race," the Iditarod honors the heroism of dogsled

teams that relayed a much-needed diphtheria serum to the epidemic-threatened town of Nome in 1925. In the modern Iditarod, as many as 100 teams consisting of a single musher and 12 to 18 dogs cover more than a thousand miles of rugged, frozen, awe-inspiring terrain.

The trip will begin in Anchorage the night before the race, at the banquet where mushers draw numbers to determine the order in which they'll start. The next morning around dawn, customized team trailers pull into town, dogs yipping with excitement.

"The start of the race is electric, with all the tension of a track meet but none of the human inhibitions," says Kavanaugh. The Academy group will gather at the ceremonial starting line, mingling with dogs and mushers, asking questions and hearing stories. And when the ceremony is over, they'll move with the teams to higher, colder ground for the official race start.

With the Iditarod under way, the Academy company will travel 300 miles to Chena Hot Springs to witness the splendor of the Northern Lights, enhanced by unique scientific perspective. "Local experts are on hand to explore the physics of the phenomenon," says Kavanaugh, "and we get the best views around."

After leading nearly 30 trips, Kavanaugh finds there's only one rule to Academy travel: Expect the unexpected. "We always get lucky," he says. On the last trip, when the highly ranked veteran musher slated to talk to the group had to cancel at the last minute, Kavanaugh and company connected with the teenage son of a little-known competitor, who generously introduced his father's dog team to the group. "Imagine our delight when our young insider's father turned out to be the winner of the race," Kavanaugh says, recounting how Academy adventurers, open to anything, often find themselves ahead of the pack.



## Expedition Highlights

- Mingle with mushers and their teams before watching the start of the world's greatest dogsled race, the Iditarod.
- Travel by snowcat to one of the world's best spots for viewing the aurora borealis—and learn from local experts how to take the best photographs.
- Lounge in steamy Chena Hot Springs at 30 degrees below while watching nature's light show.
- Visit the ice-carving championships in Fairbanks, where sculptors turn 20-foot blocks of ice into astounding art.
- Learn about the beetles that inhabit Alaska, and how Alaska-in-winter relates to Alaska-in-summer.

## Trip Details

Destination: Alaska in Winter, featuring the Northern Lights and the Iditarod

Dates: March 6-12, 2009

Guides: Dave and Bev Kavanaugh

Cost: TBA

## Upcoming Academy Adventures

**Galápagos in the Year of Darwin:  
Celebrating Darwin's 200th Birthday**  
February 9-18, 2009

**Baja: Among the Great Whales  
Aboard the *National Geographic Sea Bird***  
February 14-21, 2009

**Amazon Voyage:  
Aboard *La Amatista***  
March 27-April 5, 2009

To learn more about upcoming Academy travel opportunities, please visit us online at [www.calacademy.org/events/travel](http://www.calacademy.org/events/travel), call 800.853.9372, or email: [calacademy@hcptravel.com](mailto:calacademy@hcptravel.com).

**A**fter years of anticipation, the doors of the new Academy will open to the general public for the first time on the weekend of September 27-28.

The main attraction, naturally, will be the Academy itself and the highly-anticipated exhibits and animals inside, but the celebration will also extend onto the Music Concourse in front of the Academy, with science and art

activities for the whole family, and food and entertainment from around the world.

At every level, the weekend-long festivities will celebrate the Academy's mission to explore, explain, and protect the natural world. A bottle-free drinking water system will make free water available at stations throughout the concourse, along with biodegradable cups, eliminat-

ing plastic water bottles from the event entirely. Additionally, among other measures, the booths requiring generator power will use biodiesel fuel as a cleaner burning alternative to traditional fuels.

To kick things off, Architect Renzo Piano, Executive Director Greg Farrington, Mayor Gavin Newsom, and other officials will commemorate the comple-

# Celebrate



## Activities

In the Music Concourse, visitors will be greeted by a variety of interactive activities suitable for all ages. A demonstration of the Academy's living roof will introduce people to the benefits of planted roofs and explain how they function. Children will be able to make science-themed arts and crafts projects, enjoy jugglers and face painters, climb a rock wall, and watch kid-friendly musicians and performers on-stage.



**Participants Include**  
Face Art  
Mobile Climb USA  
Purple Crayon Art Studio  
Salmon Maze



## Entertainment

In the concourse band shell, musicians and dancers representing cultures from around the world will perform throughout both days. One local band, called Junkestra, takes recycling to a whole new level and plays on a collection of "found" instruments including bottles, saws, birdcages, and other odds and ends that people have thrown away.

**Participants Include**  
Capacitor  
Chris Molla  
Circus Center  
Golden Gate Park Band  
Junkestra  
Kids Groove (Eco Show)  
Nigerian Masquerade  
Drummers

ODC Dance Company  
Red Panda Acrobats  
SF Ballet  
SF Opera  
SF Symphony Youth Orchestra  
SFJAZZ Youth Orchestra  
Sippy Cups

## Food

It's no coincidence that all of the food vendors in the concourse employ sustainable practices—that's why they were invited. That, and the fact that their food is delicious. The irresistible offerings will include tamales, fresh baked goods, vegetarian cuisine, gourmet sandwiches and salads, wood-fired pizza, and Ben & Jerry's ice cream. By featuring organic and sustainable ingredients, using biodegradable packaging, and minimizing the use of disposable items, these vendors will help reduce the event's environmental impact. Similar values are employed in the Academy's own restaurants, emphasizing the value in making sustainable choices in the kitchen.



**Participants Include**  
Alive!  
Arizmendi Bakery  
Ben & Jerry's  
Joe's Traveling Coffee  
Let's Be Frank  
Metro Crepe  
Peasant Pies  
Primavera

Rose Pistola  
Sweet Dish  
Woodfire Woody

tion of the new Academy with an opening ceremony at 8:30 am on Saturday the 27th. The event will include a Native American blessing, and a butterfly release is also planned, symbolizing the Academy's transformation from old to new. Monarch butterflies, which are native to the Bay Area, will find an ideal habitat on the Academy's living roof. Following the ceremony, the first visi-

tors will enter the museum and begin exploring the rainforest, coral reef, planetarium and other brand new exhibits.

Admission on Saturday the 27th will be free, and the museum will remain open until 9pm. Sunday the 28th will be the Academy's first general admission day; tickets can be purchased in advance at [calacademy.org](http://calacademy.org), or at the door.

**Saturday, September 27**

Opening Ceremony: 8:30 am

Hours of Operation: 9:30 am - 9:00 pm

Admission is free

**Sunday, September 28**

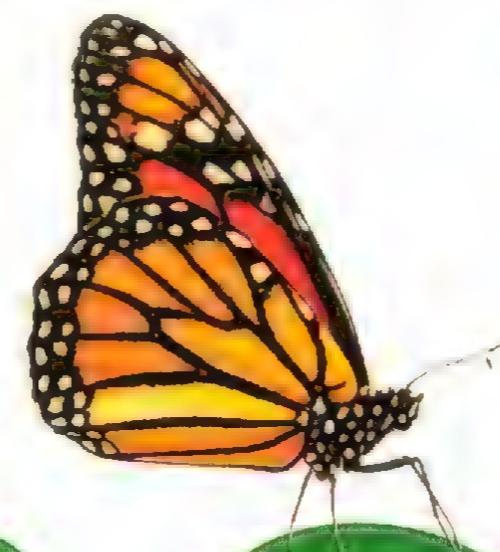
Hours of Operation: 9:30 am - 5pm

General admission rates apply

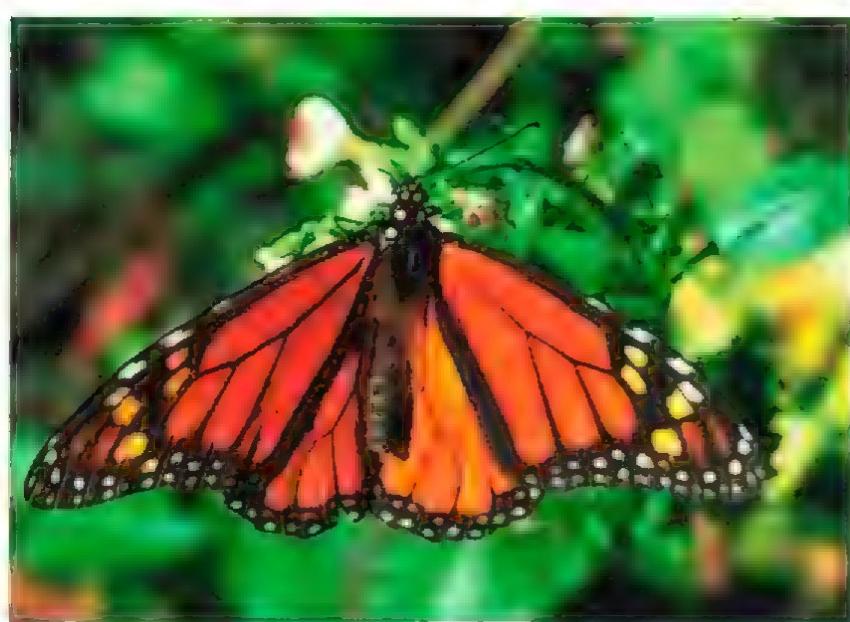
**Opening Weekend festivities**  
are presented by



# Science!



**Opening weekend festivities**  
with eco-friendly flair



## Being Green

At recycling and composting bins throughout the concourse, volunteers from SF Environment will be standing by, helping people toss their items in the proper place, and offering helpful tips for remembering what can be recycled and composted. It may not be glamorous, but waste disposal is part of daily life, and learning how to recycle and compost wisely will help any household or business divert more waste away from landfills. Pacific Gas and Electric Company will also be on-hand to share everyday tips about how to make a home more energy- and water-efficient, on any budget or schedule.

### Participants Include

Optibike  
PG&E Everyday Greening  
Phoenix Motorcars

SF Environment  
Waste Education  
SF Public Utilities  
Commission

## Buliding Healthy Habitats

Booths staffed by conservation organizations and energy experts will tie the themes being explored inside the Academy to ongoing efforts to help build healthier habitats for people and animals alike. Before (or after) visiting the bat cave in the Academy's rainforest, visitors can swing by the California Bat Conservation Fund's booth in the Music Concourse and learn more about what's being done to protect California's bat populations. And after visiting the Academy's Northern California Coast tank, guests can check in with the Marine Mammal Center to learn more about the critical role marine environments play on Earth.

### Participants Include

Amateur Astronomers  
California Bat  
Conservation Fund

### Farallon Center

Shark Van  
The Marine Mammal  
Center Van  
WildCare's Nature Van



## Reducing Your Footprint

For those pedaling their way to the opening weekend festivities, the San Francisco Bike Coalition will provide a large parking area for 2,500 bikes. Arriving by public transit? Follow the webbed footprints of the Penguin Path from 9th and Irving or from 8th and Fulton right to the front of the Academy. Walking, biking or taking public transit to the Academy is encouraged year-round, and is good for \$3 off of a general admission ticket.



## Live at the Academy

### Cool Globes Public Art Installation

August 5, 2008–January 7, 2009



Launched last year in Chicago, "Cool Globes: Hot Ideas for a Cooler Planet" is a public awareness campaign that uses art to engage the public in conversations about global warming. This fall, the Academy is hosting one of the displays as part of Cool Globes' San Francisco tour.

Local artist Lauren Davies was selected to create an original globe inspired by Academy research, collections, and sustainability programs. Davies incorporated photographs of butterfly specimens from the Academy's Entomology Department and hurricane images from the National Oceanic and Atmospheric Administration into a whirling mosaic design. The globe poetically demonstrates that regardless of how small something is, it remains part of a larger, interconnected system. By understanding and protecting the organisms that make up these systems, humans can mitigate the destructive effects of climate change.

**Location:** Davies' globe will be on display in front of the Academy

**Dates:** August 5, 2008 - January 7, 2009. It will then travel to other cities in the Cool Globes international tour.

**Information:** Visit [www.coolglobes.org](http://www.coolglobes.org)

### BioForum

#### Energy Prospects in a Changing World

Saturday, September 13, 2008  
11:00 am - 3:30 pm

In the news, on the streets, everywhere it seems, people are talking about energy. The face of energy on this planet is changing quickly. As concern over the conse-

quences of human-induced climate change grows, effort to create and implement more sustainable energy alternatives surges. Join energy experts as they share their views about the current and future states of energy. Learn about the current energy mix and the forces affecting it, with specific lectures on solar energy, wind energy, and the role that greener buildings can play in a more sustainable future.

**Location:** Academy

**Moderator:** Jane Woodward, President and CEO of MAP and Consulting Associate Professor, Department of Civil and Environmental Engineering, Stanford University

**Note:** Due to limited space, this BioForum is restricted to current high school and middle school science teachers.

**Price:** \$30, lunch included. Registration required.

**Registration:** Visit [www.calacademy.org/education](http://www.calacademy.org/education)

**Questions:** 415.379.5103

### Green Halloween

Friday, October 24, 2008

5:00 - 6:30 pm Benefactor Pre-Party

6:30 - 8:30 pm Halloween Costume Party

Don't miss the greenest scene this Halloween—flock to the Academy's eco-friendly new home in Golden Gate Park and get your fill of ghoulishly good tricks and treats. Spooktacular entertainment, crafts, and activities await, including face-to-face encounters with Academy scientists and their creepy-crawly collections. A benefit for Academy research and education programs, this family costume party sells out every year.

**Location:** Academy

**Benefactor ticket packages:** Available at \$500, \$1000, and \$2500 per family, and allow for early admission to the pre-party, valet parking, a Benefactor lounge, and other exclusive treats. General admission is \$350 per family of four.

**Information:** Contact Leslie Mehren at [lmehren@calacademy.org](mailto:lmehren@calacademy.org) or 415.379.5404

### The Leakey Foundation Public Forum for Primatology and Scientific Roundtable

Featuring Dr. Jane Goodall and Dr. Toshisada Nishida



What does it mean to be a primate? Join 20 of the greatest minds in the international scientific community as they come together to discuss this question. During the event, forum speakers will examine what scientists have learned from primatology over the past 40 years, including insights into what it means to be human. They will also look forward into the next 40 years of primatology and the new discoveries it may bring. Forum participants will include Dr. Jane Goodall and Dr. Toshisada Nishida, each of whom have spent more than four decades exploring the world of our closest living relatives, the chimpanzees. Since their journey began, they have defined the field of primatology and dramatically revolutionized our understanding of ape and human evolution.

**Location:** California Academy of Sciences

Date: Saturday, November 1, 2008

**Time:** 9 am - 3 pm

Admission: \$200 and includes a boxed lunch

**Information:** Call 415.561.4646

## Benjamin Dean Astronomy Lecture Series

**Location:** Kanbar Hall at the Jewish Community Center, 3200 California Street (at Presidio Avenue), San Francisco

**Time:** All programs begin at 7:30 pm

**Tickets:** \$5 at the door, in advance by mail, or online at [www.calacademy.org/events](http://www.calacademy.org/events)

**Questions:** E-mail [deanseries@calacademy.org](mailto:deanseries@calacademy.org) or call 415.379.8000

### Both Eyes Wide Open: The Large Binocular Telescope

Monday, September 22

Richard Pogge  
Professor and Vice Chair for  
Instrumentation  
Ohio State University,  
Department of Astronomy

After more than a decade of construction, the Large Binocular Telescope (LBT) opened both of its massive eyes on the night sky for the first time earlier this year. Located high atop Mount Graham in southeastern Arizona, the LBT is the first of a new generation of extremely large optical telescopes. Its two 8.4-meter diameter primary mirrors rest side-by-side on a single mount, giving it a light-gathering power equivalent to a single 11.8-meter mirror. This feature makes it the world's most powerful optical telescope. Join Professor Pogge as he introduces the LBT and its suite of powerful instruments, highlights some of the early scientific results, and describes its future capabilities.

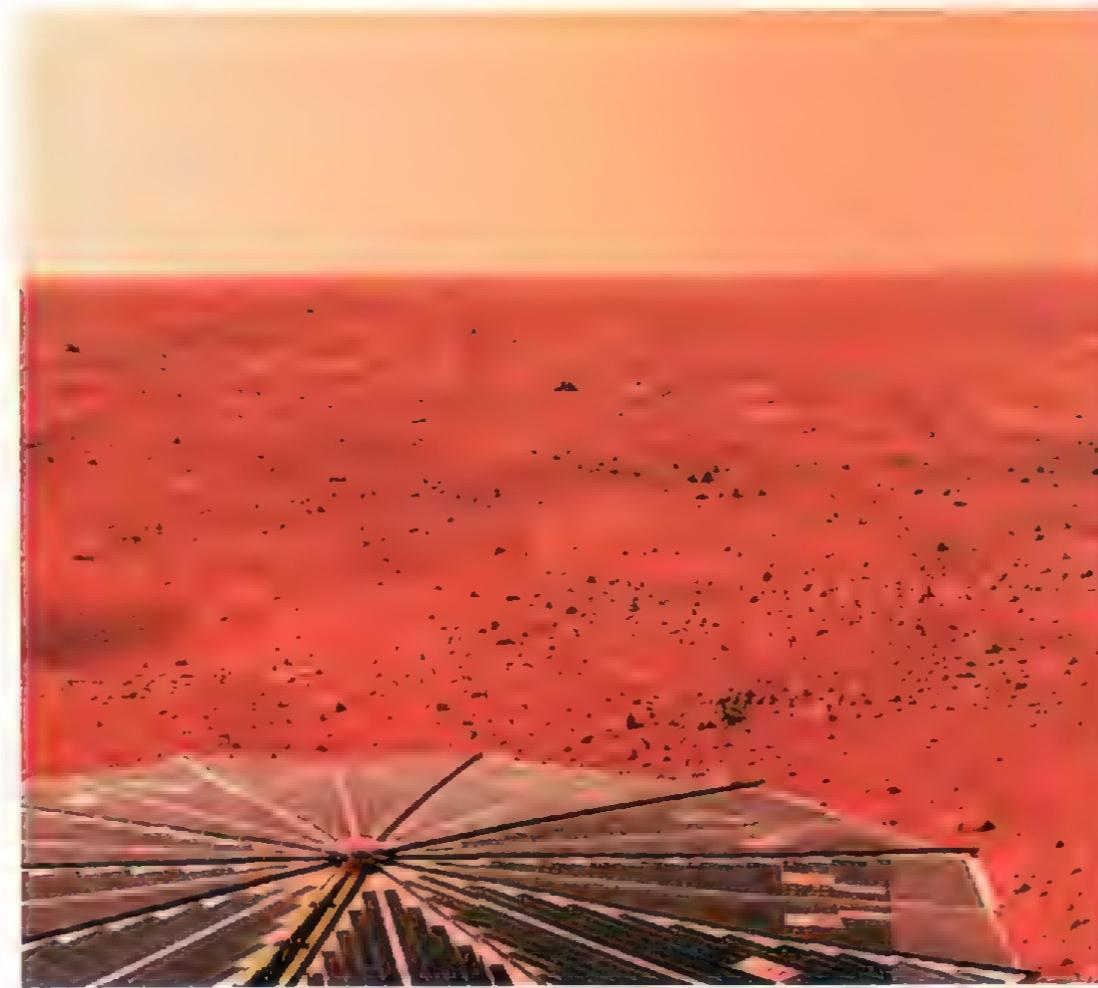
### The Phoenix Mars Mission: Uncovering the Mysteries of the Martian Arctic

Monday, October 27

Peter Smith  
Senior Research Scientist  
University of Arizona,  
Department of Planetary Sciences

On May 25, NASA's Phoenix Mars Lander touched down on Martian soil. Designed to study the history of water and search for complex organic molecules in the ice-rich soil of the Martian arctic, Phoenix will probe farther north than any previous mission to Mars. Early in its planned 90-day mission, the spacecraft

had already found water ice and had begun to characterize the Martian soil. Join Peter Smith from the University of Arizona as he discusses the early results of the Phoenix Mars Lander mission.



### Discovering New Worlds

Monday, November 3

Dr. Rachel Street  
Las Cumbres Observatory  
Affiliated with University of California,  
Santa Barbara

Humans have wondered about the existence of other planets since ancient times. Now, with the help of new technologies, scientists are actively discovering planets in other star systems. These systems are turning out to be far more diverse and extraordinary than anyone expected. Join Dr. Rachel Street as she reviews the history of our search for extra-solar planets, from the early false starts to the outstanding successes of recent years. Along the way, she will describe how these elusive objects can be found, what scientists have learned about them so far, and what forthcoming space missions may reveal.

## Don't Miss...

### EVOLVE 2009:

Find your inner Darwin

February 12, 2009

In honor of Charles Darwin's 200th birthday and the 150th anniversary of the publication of *On the Origin of Species*, San Francisco will launch a city-wide celebration of evolution this coming February. More than twenty local institutions will host lectures, exhibits and educational programs to further appreciation of what is widely considered the most important concept in modern science. In addition to a number of other special programs, the Academy will host the kickoff event for Evolve 2009 in its new building on February 12. For those who want to read ahead, Darwin's *Voyage of the Beagle* will be the focus of several talks next year.

### Drop-in Activities at the Naturalist Center

Have you ever wondered what makes a crocodile different from an alligator? Do you need help identifying a bird in your backyard? Are you hoping to learn how to live more sustainably? Find answers to questions like these and more by exploring the natural history specimens and library resources inside the Naturalist Center. The Center provides an opportunity for individual, in-depth exploration of the natural world.

To dig a little deeper, delve into a mystery box. Focused on topics such as human evolution, tidepools, coral reefs, chocolate and ethnobotany, these magical boxes contain self-guided activities and specimens for visitors to investigate. They also include links to Internet resources, books, DVDs and components of Academy exhibits. Learn all about the cocoa plant and how chocolate is grown, and then visit the Rainforests of the World exhibit to see an actual cocoa tree. Or create your own coral polyp and then see the real thing in the Philippine Coral Reef exhibit.

# Exhibiting the Natural World

From the depths of a Philippine coral reef to the canopy of a Costa Rican rainforest, a diverse array of exhibits are bringing life to life at the new California Academy of Sciences.





In any given year, most museums have the opportunity to build one or two new exhibits, the chance to rethink the treatment of perhaps a handful of topics. Of course there are limitations—the new exhibits must work within the existing building and infrastructure, and the process of integrating new themes throughout the museum is often painfully slow. But what if a museum was suddenly given a blank slate, a chance to rethink not just one exhibit but the entire museum experience? Over the past decade, the Academy has seized that opportunity, creating a new model for natural history museums that is dramatically different from its predecessors. “In many ways, we

have created the un-museum here,” says Academy Executive Director Greg Farrington. “In the past, natural science museums were buildings with thick walls and high columns, and they were all about history. The Academy is almost the inversion of that. Light streams in, the building is full of life, and the research and exhibition programs are focused as much on the future as they are on the past.”

Unlike the Academy’s first home in Golden Gate Park, which included 12 different buildings that were physically and thematically separated from one another, the new Academy is housed in one unified building. Two themes will run throughout the exhibits, and they are among the most important scientific

topics of our time: the biodiversity and sustainability of life on Earth.

Perhaps no design element illustrates this new unification better than the living roof, which drapes over the entire building, evoking the interdependence of earth, ocean, and space. The natural history museum, aquarium, and planetarium that sit underneath this roof are physically and thematically intertwined. For example, the animals of Steinhart Aquarium, once confined to their own hall, are now found throughout the building. Even the new Morrison Planetarium will address the biological sciences in addition to space sciences, capitalizing on the Academy’s international research program. Furthermore, the

building functions as an exhibit in and of itself—the piazza, solar canopy, exterior gardens, and roof observation deck are all spaces that invite discussion about sustainable practices.

After ten years of planning and research, hundreds of gallons of paint, thousands of hours of planetarium show coding, and countless cross-city truckloads of migrating animals, the exhibits of the new Academy are ready for their debut. Following is a brief overview of how the three public components of the Academy—the natural history museum, aquarium, and planetarium—have evolved to the present, followed by a comprehensive, illustrated look at the integrated new exhibits.



## Steinhart Aquarium

The original Steinhart Aquarium opened in 1923, and it quickly became world-famous for its novel exhibits and unusual animals. It was the model for many of the public aquariums that opened in the years that followed.

The new Steinhart is one of the most biodiverse and interactive aquariums in the world. Home to an estimated 38,000 animals representing more than 900 separate species, it offers guests an unprecedented view of underwater life and provides insight into the importance of aquatic environments on Earth. More than half of the public exhibit space in the new Academy is devoted to the aquarium.

Among the new exhibits are the world's deepest living coral reef tank, a four-story rainforest display, and a unique, ever-changing Water Planet exhibit. Aquarium animals have also been incorporated into all of the major natural history exhibits—among other animals, penguins and fish now swim in African Hall, tortoises have taken up residence in Islands of Evolution, and rattlesnakes are on display in Altered State.

As a nod to the past, several components of the original Steinhart are returning as well, including the dramatic entrance columns and the popular Swamp exhibit, complete with its original bronze seahorse railing.

## Kimball Natural History Museum

The first public face of the Academy was its natural history museum, which opened in 1891 in downtown San Francisco. After the devastation of the 1906 earthquake, the Academy built a new museum in Golden Gate Park that opened in 1916, in the form of a single hall showcasing North American birds and mammals. Over the next eight decades, the museum expanded to a dozen natural history halls. Damage sustained during the 1989 earthquake forced the Academy to rebuild again.

In contrast to the dark, segregated halls of traditional museums, the Kimball is forging a new paradigm of exhibits to fill the vast, light-filled spaces designed by architect Renzo

Piano. This paradigm includes changeable, modular exhibits that can be easily updated to reflect the latest scientific breakthroughs; integration of live animals and interactive technology; a focus on people-facilitated interpretation; and a dispersed exhibit layout that intertwines with the aquarium and planetarium.

Returning favorites from the old Academy—such as African Hall and the Foucault pendulum—will sit alongside brand new exhibits, which draw heavily from the Academy's 155-year legacy of research, its 20 million specimens, and the expertise of its 300 scientists and affiliates.





## Morrison Planetarium

The original Morrison Planetarium opened in 1952 with the best technology of its time—a homemade star projector built by Academy staff. The new Morrison will repeat the feat, once again employing the best technology of its day. New digital projector and software technologies, driven in part by advances in the video game industry, will allow the planetarium to produce the most accurate and interactive digital Universe ever created. The 75-foot-diameter screen, essentially the Academy's largest computer screen, is the largest all-digital planetarium in the world.

Properly lit, the dome will seem infinite to the entering visitor, creating a uniquely

immersive experience. Audience members will view a show that fills almost half their field of view and moves at a rate of 30 images per second, which visually approximates an alternate reality—corresponding not to an experience under a dome, but to an experience inside an environment.

The planetarium has the flexibility to host many events: live NASA feeds, broadcasts from Academy scientists in the field, solar eclipses half a world away, traditional star shows, musical events, and more. In the opening year, the planetarium's main program will be *Fragile Planet*, a 30-minute virtual journey from the Earth to the outer reaches of the Universe and back.

**"In many ways, we have created the un-museum here. In the past, natural science museums were buildings with thick walls and high columns, and they were all about history. The Academy is almost the inversion of that. Light streams in, the building is full of life, and the research and exhibition programs are focused as much on the future as they are on the past."**

GREG FARRINGTON  
ACADEMY EXECUTIVE DIRECTOR

# Chart your favorite course through the new Academy using this map and guide.

Letters on the map correlate to exhibit descriptions on the next page. From the Early Explorers Cove (designed especially for children five and under and their caregivers) to new installations by acclaimed artist Maya Lin, there's something for everyone inside the new Academy.



## A Academy Gardens

Planted with native species, the Academy gardens include two art installations by Maya Lin (one of which will not be unveiled until Earth Day of 2009) and an aviary for birds of prey.

## B African Hall

Lions, and cheetahs, and zebras, oh my! Take a virtual safari through Africa and encounter these animals—and many others—inside intricately crafted dioramas. Look closely as you wander through the hall, and you'll find some live animals as well, including tortoises, lizards, and a colony of African penguins.

## C Altered State:

### Climate Change in California

Walk beneath an 80-foot-long blue whale skeleton, gaze up at a towering *T. rex*, come face-to-face with a live rattlesnake, and marvel at dozens of other California treasures. Then track the potential impacts of climate change in California and around the world, and learn what you can do to help. Measure the impact of your family's every-day decisions on a carbon scale, help polar bears move from one ice floe to another in an interactive Artic Ice projection room, and share your ideas for treading more lightly on the planet.

## D Building Green

Touch a piece of denim insulation, explore energy conservation methods, and learn what it takes to create one of the greenest buildings on Earth.

## E Northern California Coast

It never rains at the Academy's Northern California Coast, an exhibit that highlights the state's diverse marine environments. Watch waves roll onto a sandy beach, talk to scuba divers inside a 100,000-gallon rocky coast tank, play hide-and-seek with a giant Pacific octopus, and get a closer look at a Red-tailed hawk. You can even hold a hermit crab at the Discovery Tidepool and meet a 165-pound sea bass in the Tank of Giants.

## F Early Explorers Cove

Take your scientist-in-training to the Early Explorers' Cove, a special exhibit designed for infants, preschoolers, and their caregivers. Tots can explore a 15-foot replica of the Academy's 1905 research schooner, climb into a tree-house, tend a miniature organic garden, or crawl into a child-sized burrow. The exhibit is also well-stocked with books, toys, puzzles, and dress-up costumes.

## G Forum

Home to an auditorium and 3D theater, the Forum hosts special lectures, programs, and temporary exhibits. The first Forum feature, a 3D movie called Bugs!, is a foray into the fascinating world of Borneo's insects.

## H Islands of Evolution

Visit the remote islands of Madagascar and The Galapagos through the eyes of Academy scientists, and discover why islands function as laboratories for evolution. Examine specimens collected during Academy research expeditions, including Galapagos tortoise shells and Darwin's famous finches. Learn how scientists search for new species, and then put your new knowledge into practice, netting virtual butterflies with Wii gaming wands and setting pit-fall traps for virtual beetles.

## I Morrison Planetarium

Leave Planet Earth behind as you fly to the farthest reaches of the Universe inside the world's largest all-digital planetarium. A live presenter will take you on a guided tour of the solar system and beyond, using current data from NASA to chart your course. During a visit to the international space station, you'll gain a new perspective on your home—the only planet known to support life.

## J Naturalist Center

Have a question about the natural world? The reference librarians and educators at the Naturalist Center can help you answer them. Bring in your leaves, feathers, rocks, shells, and other personal treasures for identification, look up the latest research on green technologies, or sign up for a special program in the adjoining classrooms and labs.

## K Philippine Coral Reef

Dive into the world's deepest living coral reef tank without donning a wetsuit. Five underwater windows offer a fish's eye view into one of the most diverse ecosystems on the planet. Find Nemo—and 2,000 other reef fish—darting through a technicolor forest of coral, watch garden eels emerge from their underwater burrows, and follow a boardwalk through a mangrove lagoon, where sharks and rays cruise beneath your feet.

## L Rainforests of the World

Step inside a living rainforest, where dripping water sets the beat for a symphony of croaking frogs and chirping birds. Peer into one of Borneo's bat caves, meet chameleons from Madagascar, and climb into the tree-tops of Costa Rica to find free-flying birds and butterflies. Finally, descend in a glass elevator into the Amazonian flooded forest, where an acrylic tunnel allows you to walk beneath the catfish and arapaima that swim overhead.

## M Research Lab

Watch Academy scientists at work through the windows of this active research laboratory. Next door, peek into one of the storage rooms for the Academy's 20 million scientific specimens.

## N Science in Action

Go beyond the headlines and gain in-depth information about recent scientific discoveries around the world. Live talks by Academy scientists, audio-visual displays, computer stations, and podcasts provide a reliable source of timely and relevant news about the natural world.

## O The Living Roof

Stop and smell the wildflowers during a visit to the Academy's living roof, a 2.5-acre expanse of native California plants. Part of the museum's green building strategy, the roof provides superior insulation, prevents storm water runoff, reduces the urban heat island effect, and creates new habitat for native birds, butterflies, and other beneficial insects.

"We're giving our guests a chance to fall in love with nature."

CHRIS ANDREWS  
DIRECTOR OF STEINHART AQUARIUM

## P The Swamp

Peer over the bronze railing of The Swamp tank if you dare—American alligators and alligator snapping turtles rule the water below. One of these reptiles, an albino gator with startling white skin, may steal the lion's share of the attention, but it's hard to ignore his neighbors for too long. Snakes, frogs, and salamanders live in smaller tanks nearby, and a biologist often brings a Great horned owl into the exhibit to meet visitors.

## Q Water Planet

What does it take to live underwater? Find out in this innovative exhibit that includes more than 100 aquarium tanks filled with fish, reptiles, amphibians, insects, and other invertebrates. Once an hour, the lights go down inside the tanks, the room transforms into a 360-degree projection theater, and visitors are immersed in a five-minute video about the most precious resource on the planet: water.

# Skyguide



## Mercury

36 million miles from the Sun

The smallest of the planets makes a brief appearance in the evening sky low in the west just after sunset, clustering with Mars and Venus for much of September, though they may be a challenge to spot in the glow of the setting Sun. It disappears from view in late September, passing inferior conjunction on October 6, then takes a high leap into the morning sky from mid-October through about mid-November.

The crescent Moon can be seen nearby on the evenings of September 1 and 2 and the morning of October 27.



## Venus

67.2 million miles from the Sun

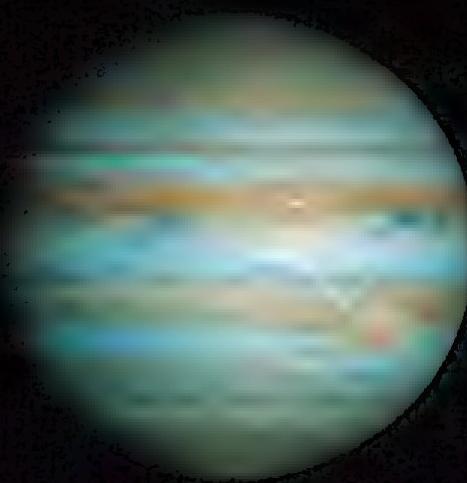
The brightest planet in the sky lingers in the southwest after sunset for the rest of the year, slowly moving from the stars of Virgo to Libra, Scorpius, Ophiuchus, and finally into those of Sagittarius. Don't miss its spectacular—but difficult—clustering with Mercury, Mars, and the Moon on September 1, after which it lingers with Mars and Mercury for most of September. Watch as the sky shifts with time, carrying Jupiter over to the southwest for a late-November encounter with Venus. The Moon passes nearby on the evenings of September 1 and October 1 and 31.



## Mars

141.6 million miles from the Sun

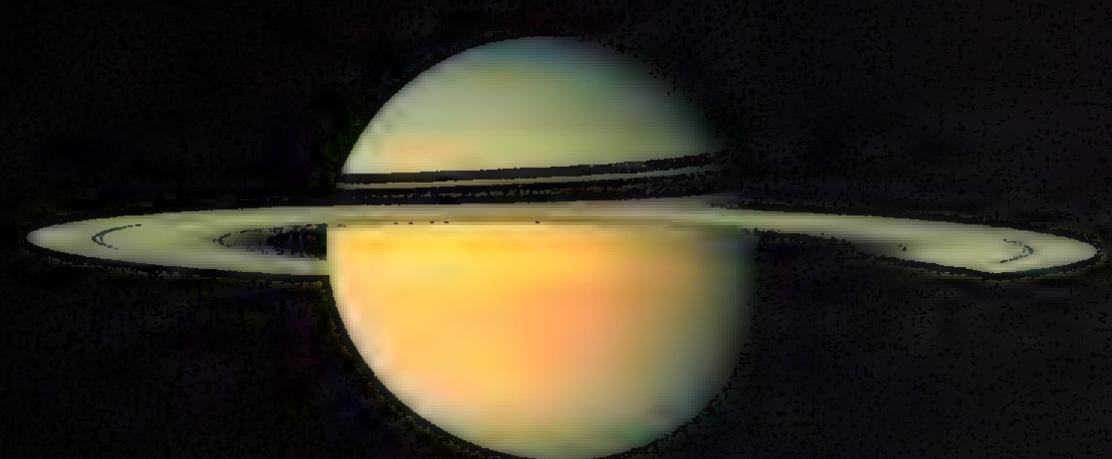
If you look very low in the west soon after sunset in early September, you might glimpse the "Red Planet." Otherwise, Mars is very obscured from view in the Sun's glare for the rest of the year.



## Jupiter

483.6 million miles from the Sun

The "King of the Planets" is due south about an hour after sunset in early September, against the stars of Sagittarius the Archer, where it lingers the rest of the year. With each night, the sky carries it slightly more eastward, and by late November, it's located in the southwest just after sunset, joining up with Venus for a spectacular encounter between the two brightest planets in the sky. Jupiter pairs prettily with the Moon on the evenings of September 9, October 6, and November 3.



## Saturn

886.7 million miles from the Sun

The "Ringed Planet" enters the morning sky, rising slightly before dawn in September against the stars of Leo the Lion. Rising slightly earlier each morning, it gradually climbs higher above

### Back to the Moon...with a Bang

Barring unanticipated delays, by late November NASA plans to launch its first spacecraft to Earth's Moon in a decade. A dual mission called LRO/LCROSS, the payload consists of two components. The first is the Lunar Reconnaissance Orbiter, which will orbit the Moon for at least one year and photograph its surface with such resolution that, in some places, it will be able to see objects less than one meter across—resulting in the most detailed and comprehensive map of the Moon ever created. This will help NASA select the most optimal landing sites for future missions. The second component of the mission is the Lunar Crater Observation and Sensing Satellite, which will slam into the floor of the Shackleton crater and hopefully raise a cloud of debris. Scientists will look for evidence of water-ice in this debris cloud.

### The Egg Myth

Do eggs stand up on end only on the equinox? Is this something you should try on September 22? Believe it or not, with effort you can get eggs to stand up on end any time—this myth is busted.

A Starry Impostor Telescope-users' alert: Don't be fooled by the faint object aligned with Jupiter's Galilean moons the nights of November 11 and 12—it's a star, not another Jovian moon.

Happy Birthday! Jean Bernard Leon Foucault, inventor of the Foucault pendulum, was born on September 18, 1819. The Foucault pendulum demonstrates the effect of the Earth's rotation, proving that the planet spins.



### The Seventh Planet

The distant planet Uranus is at its brightest on September 13, allowing the sharpest-eyed stargazers to see it with the naked-eye (but only barely) near the border between the two constellations Aquarius and Pisces. All others will need telescopes to see it as a greenish "star." William Herschel, the discoverer of Uranus, was born on November 15, 1738. He discovered the seventh planet by accident, thinking at first that it was a comet.

## Skywatcher's Guide (September–November 2008)

### September 1

Although the New Moon was two days ago, the first young crescent isn't visible until sunset tonight, marking the start of the month Ramadan in the Muslim calendar.

### September 15

Tonight's Full Moon is the one nearest the September equinox. Rising at sunset and less than an hour later each subsequent night afterward, it provides usable light well after nightfall, allowing farmers to keep working in the fields very late into the evening. For this reason, it's also known as the "Harvest Moon." Other traditional names for this full Moon include the "Cool Moon" from the Cheyenne, the "Salmon Spawning Moon" from the Haida, and the "Moon Without a Name" from the Paiute.

### September 22

Autumnal equinox for the Northern Hemisphere at 8:44 am PDT. In the Southern Hemisphere, this is the Spring equinox—to avoid confusion, some identify the equinoxes or solstices by the month in which they occur, so this day is also known simply as the September equinox.

### September 29

New Moon at 1:12 PDT. In the Muslim calendar, naked-eye sighting of the first crescent after new marks the start of the month Shawwal, but this sighting may not occur for observers in much of the U.S. until October 1. In contrast, the Jewish New Year, Rosh Hashanah, traditionally begins at sunset on the night of September's New Moon, when the sky is dark enough for three stars to be seen. L'shana tova!

### October 8

Fiery "dragon's-breath" may streak the sky tonight—or is it the peak of the Draconid meteor shower? Also known as the Giacobinid meteors, after the comet associated with it, this display radiates from the stars of the constellation **Draco the Dragon**. The first quarter Moon will set a little after midnight, which will help observers trying to glimpse this highly-variable shower of slow-moving meteors. Recently weak-to-modest, but noted for surprising outbursts in 1933 and 1946.

### October 14

Full Moon. Following the Harvest Moon, this Moon is also called the Hunter's Moon because the now-harvested fields provide fewer hiding places for prey animals at night. Native American names include the "Falling River Moon" from the Kutenai, the "Blackberry Moon" from the Choctaw, and the "Deer Breeding Moon" from the Osage.

### October 21

Peak of the Orionid meteor shower, caused by debris from Halley's Comet passing through Earth's atmosphere, seeming to radiate from the stars of Orion the Hunter. Usually about 25-30 fast and bright meteors per hour, but this year, the peak coincides with a last quarter Moon, which rises about midnight. Its light could obscure viewing during the best viewing hours.

### October 28

New Moon. Tomorrow night, look for a thin crescent Moon low in the west after sunset. In the Muslim calendar, when this crescent is first seen with the naked eye, the month Dhul-Qi'dah begins.

### November 2

Standard Time resumes at 2:00 a.m. in most of the U.S. on the first Sunday in November, when clocks are set back one hour. For residents of American Samoa, Hawaii, Arizona, most of Indiana, and in Puerto Rico and the Virgin Islands, where Daylight Time is not observed...never mind.

### November 13

Full Moon, also known to the Algonquin as the "Beaver Moon," to the Natchez as the "Bison Moon," and to the Micmac as the "Tomcod Moon." During the months surrounding the Winter solstice, the full Moon transits very high across the heavens at night while the Sun crosses very low during the day.

### November 17

Peak of the annual Leonid meteor shower. Coinciding with a waning gibbous Moon, all but the brightest meteors may be obscured by the Moon's bright light. Since the Leonids encounter Earth head-on, they are swift and often bright, many with lingering trails.

### November 21

Peak of the Alpha Monocerotid meteors. Usually a minor display, but in 1995, it put on a 30-minute burst of up to 400 meteors per hour, radiating from the constellation of the Unicorn.

### November 27

New Moon. Sighting of the first visible crescent at sunset tomorrow (Nov. 28) marks the start of the month Dhul-Hijjah in the Muslim calendar.

### Local Noon

1:09 pm PDT

### Sunset

7:38 pm PDT

12:59 pm PDT

6:52 pm PDT

12:53 pm PDT

6:10 pm PDT

Times are for San Francisco, CA, and will vary slightly for other locations.



A Dark Halloween  
On Friday, October 31, the Moon is a thin, waxing crescent that sets 90 minutes after sunset, making for a dark, relatively moonless Halloween night—watch out for those trick-or-treaters!



Q & A



## Insiders Tell the Best Stories

Exciting, interactive exhibits in the new Academy will bring vibrancy to topics like biodiversity and sustainability.

The exhibits also reflect the vision and generosity of Academy Friends like Raj and Helen Desai, and corporate partner Pacific Gas and Electric Company.

## What are Raj and Helen Desai most passionate about? Family. Science. Art. And living in harmony with the Earth. Their love for the Academy brings it all together.

Q: How did the two of you first become interested in science and the natural world?

**Raj:** Helen grew up near Southern California's oceans and deserts, where it was impossible not to be aware of nature. And I grew up in Mumbai, India. When I was a teen, a major earthquake hit the city. My interest in discovering the forces behind such devastation led me to study engineering at UC Berkeley. Also, in Indian culture, many holidays are in sync with the lunar cycle, so an awareness of nature is woven into daily life. So is the idea of conserving resources; recycling was simply part of the way we lived.

Q: You could be considered local sustainability pioneers. How did you earn that reputation?

**Helen:** We've lived near Golden Gate Park, in the Richmond District, for 50 years. In the 1970s, a panel of scientists gave a talk at our neighborhood YMCA about the impacts of pollution and population growth on natural resources. This galvanizing experience inspired us to start the first recycling center in San Francisco, right in our garage. Eventually we expanded, and then the city got involved. (We wanted to build our own windmill as a neighborhood energy source, but it proved too complicated.)

Q: Helen, you taught art history and led tours at the Asian Art Museum. How do art and nature fit together for your family?

**Helen:** I think an interest in the natural world goes hand-in-hand with art. In fact, for generations of scientists—from da Vinci to Audubon to 20th century botanists—art was critical to exploring, documenting, and sharing the natural world.

**Raj:** And we've always felt that both art and nature have the power to lift you up from the troubles of daily life.

Q: Thanks to your generosity, children visiting the Academy will be able to climb into a "bubble window" and pop up inside the Philippine Coral Reef tank. Why did you decide to sponsor this feature?

**Raj:** Whenever our family went to the Academy, the aquarium was the first place our children would visit. And we loved the romantic notion of providing the kind of close-up experience you usually only get underwater, in places like Hawaii and Australia.

**Helen:** Creating something just for children—their own magical space—appealed to us. And just imagine the view they'll have, surrounded by colorful tropical fish. It brings to mind the amazing glasswork of Dale Chihuly—just one example of how art and nature can inspire the same sense of wonder.

To learn more about the Friends program, call 415.379.5413 or visit [www.calacademy.org/friends](http://www.calacademy.org/friends).



**Bill Morrow**  
**President and CEO of Pacific Gas and Electric Company**  
As CEO of the Academy's lead corporate sponsor, Bill Morrow cares deeply about creating a more sustainable world. As a future Academy visitor, he can't wait to see how the new Academy inspires each of us to care about our planet.

**An unforgettable early experience**  
When I was 13, I accompanied a teacher to the Philippines, where we explored the rainforest. That trip impressed upon me the amazing biodiversity we are graced with and the critical need to protect it for future generations.

**Why the Academy**  
Climate change is one of our most complex challenges, and everyone can play a role in developing solutions. In addition to providing some of the cleanest energy in the nation, PG&E reaches out to Californians with information about renewable energy and energy efficiency. Supporting the Academy integrates two causes close to our heart: environmental stewardship and community involvement.

**I can't wait to see...**  
...The Altered State exhibit. It will evolve to reflect advances in climate change science and let visitors share ideas for reducing our footprint on the planet. I also look forward to stepping into the rainforest and re-capturing the wonderment I experienced in the Philippines.

*To learn more about corporate giving opportunities, please call 415.379.5409 or visit [www.calacademy.org/give](http://www.calacademy.org/give).*

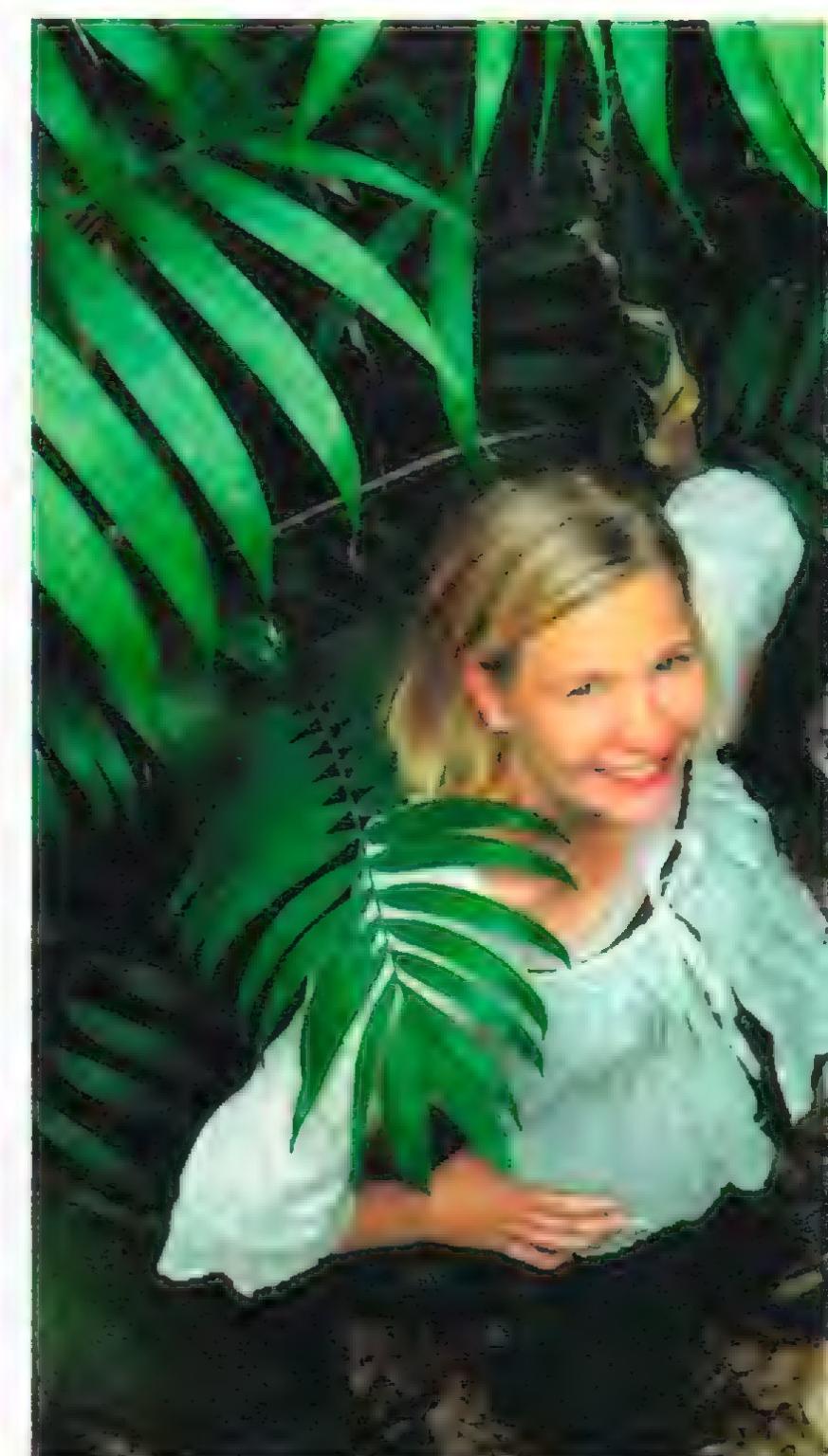
## On the Scene

It's countdown to opening day, and Academy community members are taking advantage of "first peek" privileges in the Park.

① Guild steering committee member Deirdre Pharr and daughter enjoy a Guild picnic.



③ Pauline and Tom Tusher talk with painter Marc Nicely, who is putting the finishing touches on the Gorilla diorama in Tusher African Center.



④ Halloween co-chairs Molly Wadhwani and Vickie Nelson prepare for a Green Halloween.

⑤ Young explorers investigate the tidepools at Guild family event.

⑥ Academy Members and longtime star volunteers Ann and Walter Weybright take a break from moving the library stacks.

⑦ Mary Lou and Malou Babilonia from Pusod, a nonprofit partner organization dedicated to protecting ecosystems in the Philippines, join Academy scientists Terry Gosliner and Meg Burke to check on the Academy's Philippine Coral Reef. Malou is an Eastwood Associate and an Academy Friend.

⑧ Academy Friends Maxine Rosston & Frances Varnhagen enjoy seeing the seahorse railing at the new Swamp.



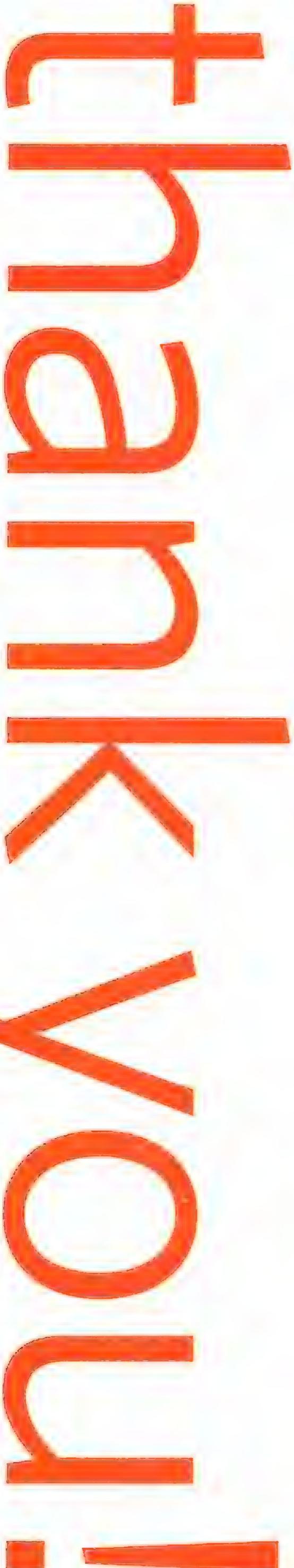
Get closer to science and the natural world, and be part of an exciting future by deepening your relationship with the Academy. Your increased support gives you a front-row seat as the new Academy prepares to open its doors.

Become a Friend and enjoy exciting new benefits, including an exclusive opening reception and private behind-the-scenes experiences. Learn more at [www.calacademy.org/join/friends](http://www.calacademy.org/join/friends).

The greenest Guild welcomes members with children who want to learn and experience more with their families, and get involved with science in fresh and exciting ways. Learn more at [www.calacademy.org/join/guild.php](http://www.calacademy.org/join/guild.php).

In the spirit of cosmic new beginnings, help us kick off the new California Academy of Sciences with a bang-up celebration. The **Big Bang Opening Gala** happens Thursday, September 25, 2008, with a buffet dinner, music, and surprises. For more information or for tickets, call 415.379.5420.





The Academy has made every effort to ensure the accuracy of donor lists. Should you find an error, please contact the Development Department at 415.379.5405 or [friends@calacademy.org](mailto:friends@calacademy.org)

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# The Last Frontier

Rumbling volcanoes, lush rainforests, and majestic Andean peaks—Academy scientist Charles Griswold and graduate student Hannah Wood saw it all during a recent expedition to South America. A few months ago, the pair and a team of collaborators traveled throughout Chile in search of specimens from the country's temperate rainforest region. They had two goals: assess the biodiversity of insects and spiders in the rainforest canopy, and catch live assassin spiders for Wood's Ph.D. dissertation.

Very little is known about life in the forest canopy. Griswold calls it "the last biotic frontier, akin to the deepest part of the ocean." Like the deep sea, the forest canopy has remained a mystery

mostly because of its inaccessibility. One must either climb a tree, or stand in a crane or balloon. Movement is highly constrained using these approaches.

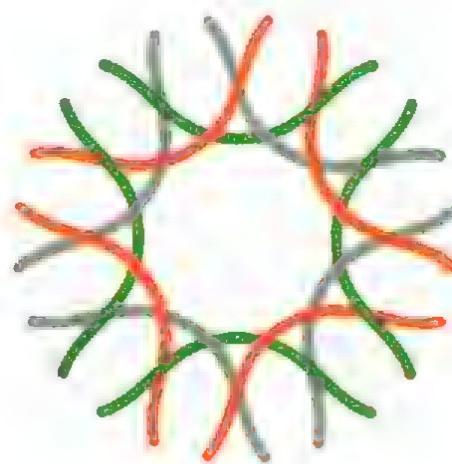
So Griswold and team tried a different approach: bringing the specimens down to the forest floor. First they laid nylon tarps on the ground. Then they cranked up a "fogger," a machine that resembles a leaf blower but blows smoke into the canopy. For about an hour, insects and spiders drifted down onto the tarps, where the scientists were waiting to collect them. Griswold estimates that a single tree yielded up to 100 different species of spiders. Considering the vast unexplored forest canopies in not just Chile but across the entire planet, the number of

species yet to be discovered is likely staggering.

During the second half of their expedition, Griswold and Wood focused on assassin spiders—members of the family Mecysmauchenidae that are infamous for hunting and stabbing their prey rather than trapping them in webs. Every morning, the two scientists gathered leaf

litter and soil, spread it on a tarp, and waited for spiders to emerge. They caught more than 100 assassin spiders this way—practically equaling the number of South American specimens in all the world's collections. The next stop: New Zealand, the only other place in the world where members of this family live.

This assassin spider was photographed at 25X magnification.



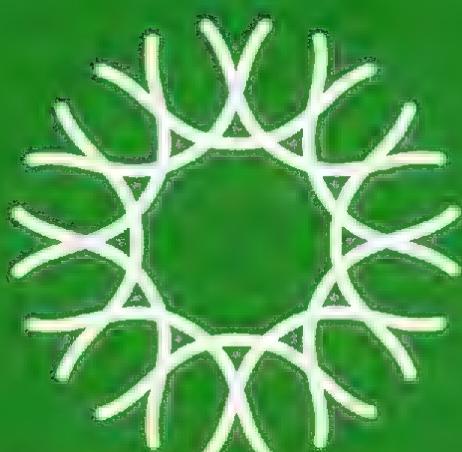
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Doors Open September 27, 2008

# Live at the Academy

September / October / November  
2008



# September



## Saturday, 9/13

BioForum  
Energy Prospects in a  
Changing World  
11 am - 3:30 pm  
Join a panel of experts  
as they share their views  
about the current and  
future states of energy.  
Reservations are re-  
quired; tickets cost \$30.  
For more information,  
see page 14. Due to lim-  
ited space, this BioForum  
is restricted to current  
high school and middle  
school science teachers.

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## Saturday, 9/13

Academy Guild  
Reception  
1 - 4 pm  
Members of the  
Academy Guild are  
invited to preview the  
new museum during  
a special reception.  
For more information  
about the Guild, please  
visit [www.calacademy.org/join/guild](http://www.calacademy.org/join/guild) or call  
415.379.5404.

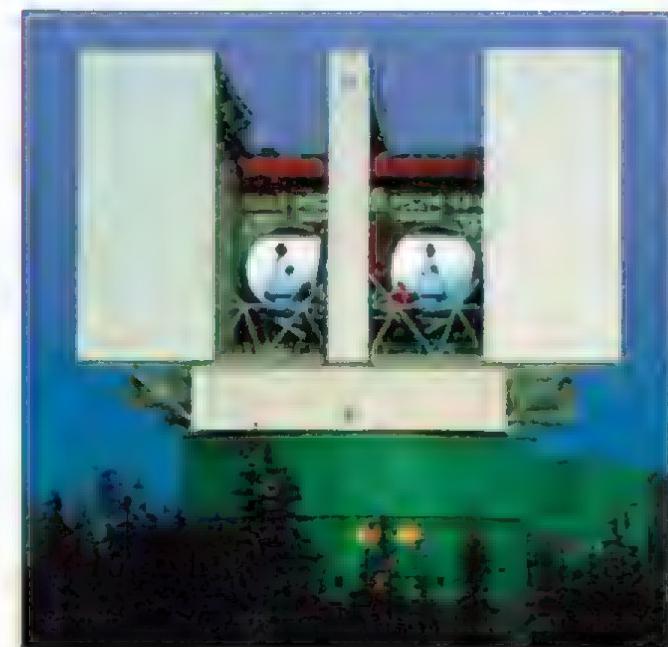
## Monday, 9/15

Eastwood Associates  
Reception  
5:30 - 8:30 pm  
Eastwood Associates,  
supporters who have  
recognized the Academy  
in their estate plans, are  
invited to preview the  
new Academy during  
a special pre-opening  
reception. For more  
information about the  
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## Saturday, 9/20

Academy Friends  
Reception  
6 - 9 pm  
Academy Friends are in-  
vited to preview the new  
museum during an exclu-  
sive reception. For more  
information about the  
Friends program, please  
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415.379.5413.



## Monday, 9/22

Dean Lecture  
Both Eyes Wide Open—  
The Large Binocular  
Telescope

7:30 pm  
Join Richard Pogge from  
Ohio State University as  
he introduces the Large  
Binocular Telescope, the  
first of a new generation  
of extremely large optical  
telescopes. Lecture takes  
place in Kanbar Hall at  
the Jewish Community  
Center; tickets cost \$5.  
For more information,  
see page 17.

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## Thursday, 9/25

Opening Gala  
The Big Bang  
6 pm - 1 am

Don't miss the hottest  
happening in the galaxy,  
a bang-up celebra-  
tion featuring inspired  
cuisine, other-worldly  
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# October

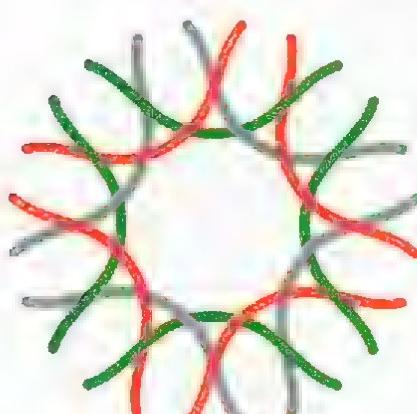
at \$350. To learn more, please call 415.379.5420 or email [bigbang@calacademy.org](mailto:bigbang@calacademy.org).

### Saturday, 9/27

#### Opening Ceremony

8:30 - 9:30 am

Join us for the official opening ceremony of the new California Academy of Sciences, including a Native American blessing and a festive butterfly release. Learn more on pages 14-15.



### Saturday, 9/27

#### Public Opening Weekend

9:30 am - 9 pm

Celebrate science with the grand opening of the new Academy. To thank the San Francisco community for supporting this monumental project, the museum will be free to the public on opening day. Festivities will also extend onto the Music Concourse in front of the Academy, with interac-

tive science programs, and food and entertainment from around the world. Learn more on pages 14-15.



### Sunday, 9/28

#### Public Opening Weekend

9:30 am - 5 pm

The opening weekend festivities continue, with a full line-up of Music Concourse entertainment, activities, and eco-friendly food. Learn more on pages 14-15.

**Green Tip:**  
*Even when they are turned off, many electronics consume standby power when they are plugged in. Avoid standby power drain by unplugging or shutting off all electronics using power strips.*

## Drop-in Activities

Check out these hubs of activity, where Academy staff and volunteers are on hand every day to help you dive deeper into the natural world.

### Discovery Tidepool

During your next trip to the aquarium, don't let the fish have all the fun—start splashing at the Discovery Tidepool, where visitors can handle a few of the animals that live along the California coastline, including turban snails, hermit crabs, and sea stars. The tidepool is staffed with naturalists and trained nature lovers who can answer questions about the animals and their habitat.

Open daily during museum hours.

### Naturalist Center

Have a question about the natural world? The reference librarians and educators at the Naturalist Center can help you answer them. Bring in your leaves, feathers, rocks, shells, and other personal treasures for identification, look up the latest research on green technologies, or delve into "mystery boxes" full of specimens and self-guided activities.

Monday, Wednesday-Sunday: 10 am - 5 pm

Tuesday: 8:30 am - 5 pm

## **Wednesday, 10/15**

Wachovia Wednesday

9:30 am - 5 pm

The Academy is free to the public on the third Wednesday of each month. Large crowds are expected; members may wish to attend on a different day. This program is sponsored by Wachovia.



## **Friday, 10/24**

Green Halloween Party

5 - 6:30 pm Benefactor

Pre-Party

6:30 - 8:30 pm

Halloween Costume Party

The greenest scene this Halloween will be inside the new Academy. Join us for spooktacular entertainment, crafts,

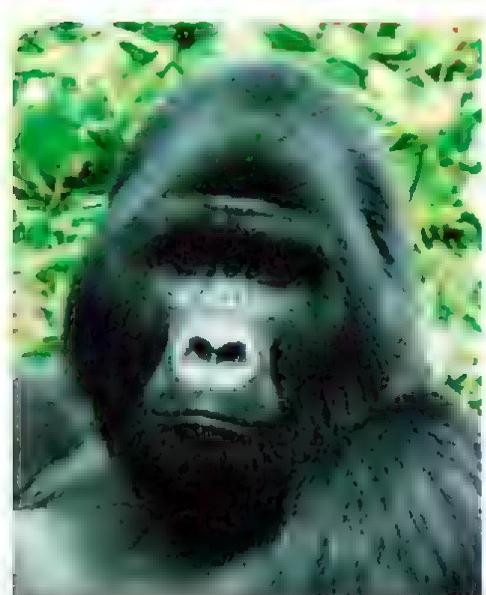
and activities, including face-to-face encounters with Academy scientists and their creepy-crawly collections. Tickets from \$350 per family of four. For more information, see page 16.

## **Friday, 10/24**

Early Closure

The Academy will close at 3:00 pm on October 24 in preparation for the Green Halloween Party.

# November



## **Saturday, 11/1**

The Leakey Foundation Public Forum for Primatology and Scientific Roundtable

9 am - 3 pm

Join 20 of the greatest minds in the international scientific community, including Jane Goodall and Toshisada Nishida, as they discuss the

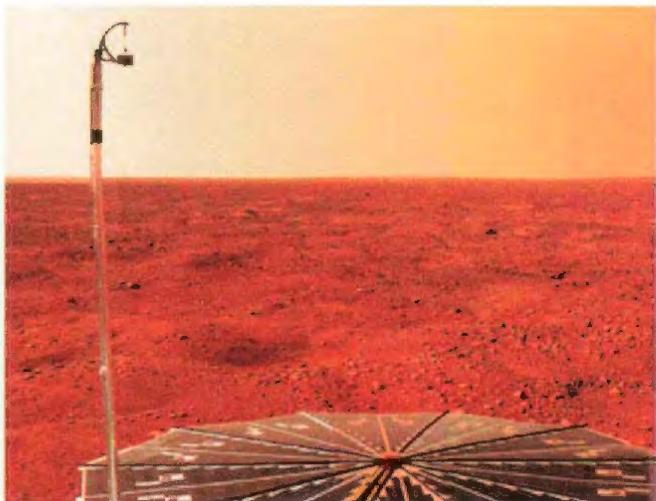
questions: "What does it mean to be a primate?" and "What does it mean to be human?" Tickets cost \$200. Learn more on page 16.

## **Saturday, 11/1**

Please note that Bugs! will not be shown in the Hearst Forum 3D Theater today.



*Rainforests of the World opens Monday - Saturday at 10:00 am and Sunday at 11:00 am.*



## Monday, 10/27

Dean Lecture

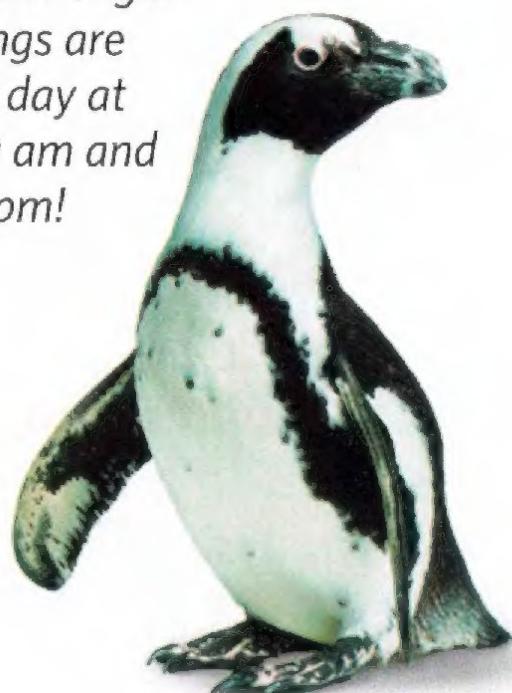
7:30 pm

### The Phoenix Mars Mission: Uncovering the Mysteries of the Martian Arctic

Join Peter Smith from the University of Arizona as he discusses the early results of the Mars

Phoenix Lander mission. Lecture takes place in Kanbar Hall at the Jewish Community Center; tickets cost \$5. For more information, see page 17.

*African Penguin feedings are every day at 10:30 am and 3:30 pm!*



## Monday, 11/3

Dean Lecture

### Discovering New Worlds

7:30 pm

Join Dr. Rachel Street as she discusses the search for extra-solar planets, from the early false starts to the outstanding successes of recent years. Lecture takes

place in Kanbar Hall at the Jewish Community Center; tickets cost \$5. For more information, see page 17.

## Wednesday, 11/19

Wachovia Wednesday

9:30 am - 5 pm

The Academy is free to the public on the third Wednesday of each month. Large crowds are expected; members may wish to attend on a different day. This program is sponsored by Wachovia.

## Early Explorers Cove

Take your scientist-in-training to a special exhibit designed especially for children five and under and their caregivers. Tots can explore a 15-foot replica of the Academy's 1905 research schooner, climb into a tree-house, tend a miniature organic garden, or crawl into a child-sized burrow. The exhibit is also well-stocked with books, toys, puzzles, and dress-up costumes.

Monday, Wednesday-Sunday: 10 am - 5 pm

Tuesday: 8:30 am - 5 pm  
Children may not be left unattended; space will be filled on a first-come, first-served basis

## Exclusive Member Benefits

### Member Preview Days

Check your mailboxes for a postcard inviting you to attend special previews for Academy members this September. Sign up information is available online at [calacademy.org/membership](http://calacademy.org/membership).

### Members-Only Hours

Beat the crowds, and visit the new Academy during special members-only hours, every Tuesday from 8:30 - 9:30 am and Sunday from 10 - 11 am.

# Every day at the Academy!

## Monday

10 am - 4 pm*	Bugs!
10:30 am	Penguin Feeding
11 am	Coral Reef Dive
11:30 am - 4:30 pm**	Fragile Planet
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

## Friday

10 am - 4 pm*	Bugs!
10:30 am - 4:30 pm**	Fragile Planet
10:30 am	Penguin Feeding
11 am	Coral Reef Dive
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

## Tuesday

10 am - 4 pm*	Bugs!
10:30 am - 4:30 pm**	Fragile Planet
10:30 am	Penguin Feeding
11 am	Coral Reef Dive
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

## Saturday

10 am - 4 pm*	Bugs!
10:30 am - 4:30 pm**	Fragile Planet
10:30 am	Penguin Feeding
11 am	Coral Reef Dive
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

## Wednesday

10 am - 4 pm*	Bugs!
10:30 am	Penguin Feeding
11 am	Coral Reef Dive
11:30 am - 4:30 pm**	Fragile Planet
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

## Sunday

10:30 am / Members Only	Fragile Planet
10:30 am / Members Only	Penguin Feeding
11 am / Members Only	Bugs!
11 am	Coral Reef Dive
11:30 am - 4:30 pm**	Fragile Planet
12 noon - 4 pm*	Bugs!
1 pm	Lagoon Feeding
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

## Thursday

10 am - 4 pm*	Bugs!
10:30 am - 4:30 pm**	Fragile Planet
10:30 am	Penguin Feeding
11 am	Coral Reef Dive
1 pm	Lagoon Feeding
2 pm	Coral Reef Dive
3:30 pm	Penguin Feeding

\*Every hour on the hour

\*\*Every hour on the half-hour



## Featured Attractions

Beginning September 27, these regularly scheduled programs will take place every week at the museum. Check the calendar section in this guide for information about additional special events. All programs are free unless otherwise noted.

### Penguin Feeding

**Location:** African Hall

The Academy's African penguins are always especially animated during meal time. Watch the birds dip and dive in their new tank at the end of African Hall as a biologist dons a wet suit and hands out vitamin-stuffed herring and capelin. Each feeding takes 20 minutes, and questions are encouraged.

**Daily:** 10:30 am and 3:30 pm

### Coral Reef Dive

**Location:** Philippine Coral Reef (Lower Level)

Watch as a diver suits up in SCUBA gear and plunges into the world's deepest living coral reef exhibit. Outfitted with an underwater microphone, the diver will answer all of your reef-related questions while cleaning the tank windows and feeding the fish and anemones.

**Daily at 11 am and 2 pm**

### Bugs!

**Location:** Hearst Forum

#### 3D Theater

A remarkable foray into the fascinating world of insects, this 25-minute feature was filmed on location in the tropical forests of Borneo. Using immersive 3D technology, the film follows the life cycles of Hierodula, the praying mantis, and Papilio, the butterfly. Slide on your special viewing glasses and see for yourself what all the buzz is about.

**Monday-Saturday:** Every hour on the hour from 10 am - 4 pm

**Sunday:** Every hour on the hour from 11 am - 4 pm

*Note: The 11 am show on Sunday is offered exclusively for members. Bugs! will not be shown on Saturday, November 1.*

### Lagoon Feeding

**Location:** Philippine Coral Reef (Level 1)

Join the Academy's shallow reef residents for lunch at the Mangrove Lagoon. Watch and ask questions as a biologist feeds vitamin-stuffed fish to the sharks and doles out a special diet of chopped clams, shrimp, squid and fish to the rays.

**Thursday and Sunday at 1 pm**

### Fragile Planet

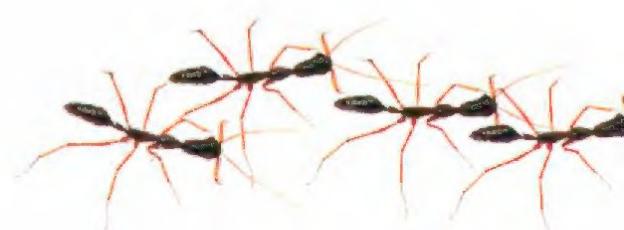
**Location:** Morrison Planetarium

Leave Planet Earth behind as you fly to the farthest reaches of the Universe in this 30-minute show. Zoom through the roof of the Academy's building, float up through Earth's atmosphere, and gain an astronaut's view of your home—the only planet currently known to support life. Then travel to the Moon, Mars, and even beyond the Milky Way to search for habitats that might support extraterrestrial life.

**Monday & Wednesday:** Every hour on the half-hour from 11:30 am - 4:30 pm

**Tuesday, Thursday-Sunday:** Every hour on the half-hour from 10:30am - 4:30 pm

*Note: The 10:30 am show on Sunday is offered exclusively for members. Seats are limited and are available on a first-come, first-served basis.*



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